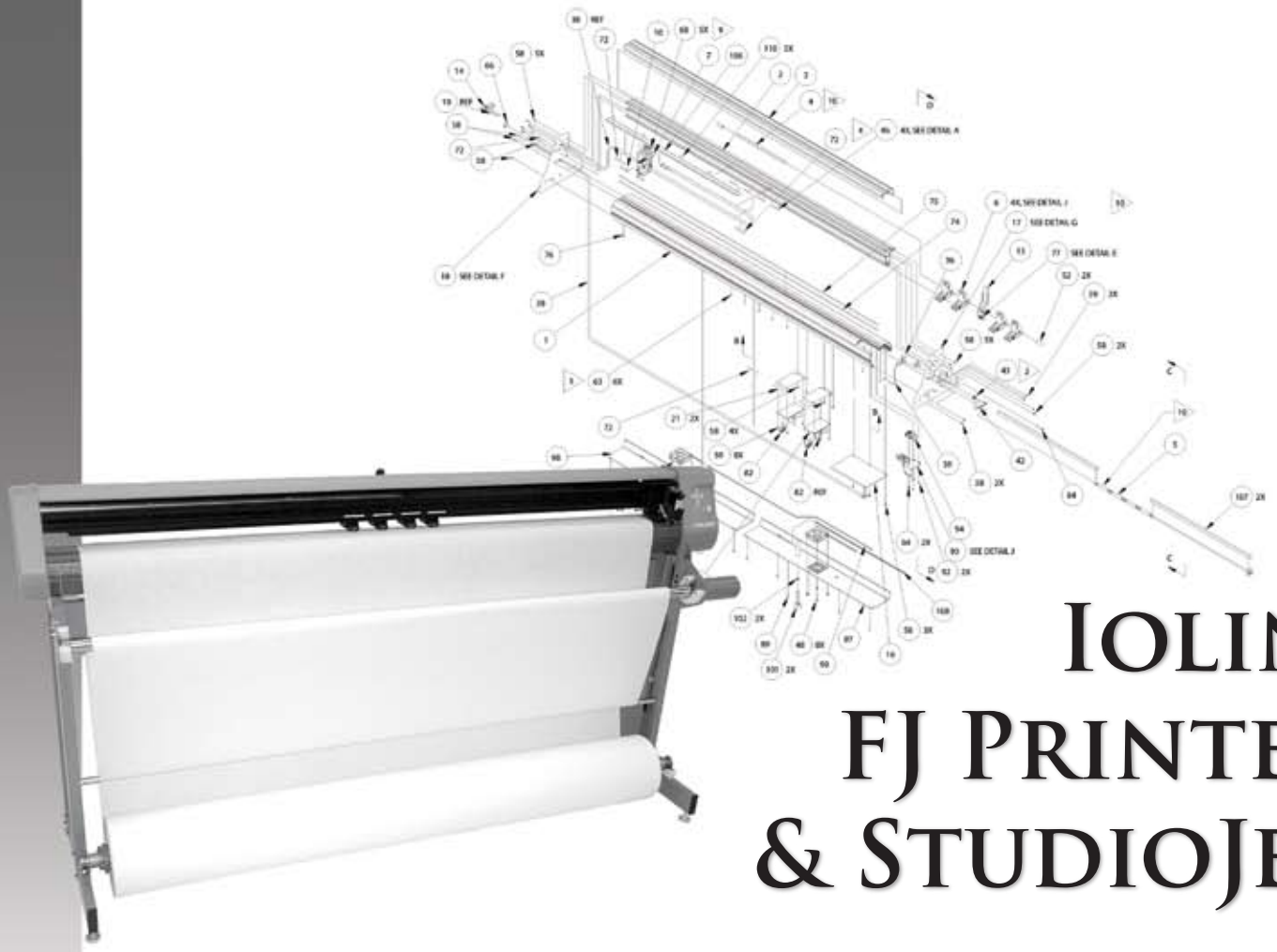
IOLINE™

Service Manual



IOLINE FJ PRINTER™ & STUDIOJET™

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Ioline has made every effort to make the StudioJet and all models of the FJ Printer easy to operate, maintain, and repair. It is the responsibility of the operator of the printer to monitor the performance of the printer and maintain it in proper working condition by following the instructions in this manual and in the product User Guide and to follow all safety precautions and warnings that are described in these publications. Ioline Corporation is not responsible for injuries that may occur as a result of unsafe use. Ioline Corporation is not responsible for substandard operational performance as a result of failure to maintain the printer as described in this manual and in the User Guide.

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Service and Support
If you require assistance with an Ioline product, your local Ioline dealer or authorized service center is ready to help. Support information is also available 24/7 on the Ioline Web site—or you may contact Ioline directly:

Ioline Corporation
14140 NE 200th Street
Woodinville, Washington 98072 U.S.A.

Ioline Customer Service Department
Monday through Friday
7:00 A.M. - 5:00 P.M. U.S. Pacific Time
Voice: 1.425.398.8282
Fax: 1.425.398.8383
support@ioline.com
www.ioline.com

Part Numbers: (Print) 109308 Rev. 0 • (File) 109307 Rev. 0

IOLINE FJ PRINTER™ & STUDIOJET™

Service Manual

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Safety & Cautions

The Ioline FJ printer and StudioJet have many fast moving components. Please read and follow these safety guidelines before beginning operation of the printer:

- ***Do not try to repair the machine without factory authorization.*** Only qualified service personnel should attempt any disassembly or access to internal components. If external mechanical adjustments are necessary, turn off the printer and disconnect it from all power sources (both the computer and the wall outlet).

- ***Be careful with hair, jewelry, or loose clothing near the printer.*** They can become caught in the mechanical parts.

- ***Never attempt to move the carriage by hand when the power is on.*** Always use the **Arrow** keys to move the carriage. To park the carriage safely in the **Service Station** and protect the print cartridges, press the **Clean** button.

Figure 1. Hold the bottom surfaces of the end covers to avoid injury to your fingers.

- ***Keep hands away from the carriage when the printer is in operation.*** The carriage will automatically move to touch the left end plate then back to the right end (the **Service Station** position) when the power is turned on.

- ***Never insert hands or other objects into the* Service Station *area on the right side of the printer.*** The carriage occasionally enters this area without warning and could collide with an obstruction, potentially causing and injury.

- ***Be careful when moving or lifting the printer.*** Moving the printer requires at least 2 people. To avoid injury to your fingers, do not lift the printer by the end plates. Hold the bottom surfaces of the end covers to lift or move it. *See* ***Figure 1***.

- ***Keep fingers away from the drive shaft when the printer is in operation. Serious injury could result.***

Note

To improve readability, the **StudioJet** is mentioned in this manual only when necessary to clarify differences in service or maintenance procedures vis à vis the FJ Printer. Unless otherwise noted, instructions pertaining to the FJ Printer are identical for the StudioJet.

Warranty Policy

Ioline warranty policy

Ioline Corporation provides a 12 month parts and labor warranty on all new equipment and 90 days on repaired units, unless specifically noted otherwise. Every unit is recorded by serial number when it leaves the factory. The warranty period is based on the serial number of the unit and extends from the date of manufacture up to 12 months, plus an extra 3 months for shelf life. Making the total warranty period 15 months from the date of manufacture.

For warranty service, the end user must work through their dealer. Ioline Customer Service is available to assist Authorized Dealers with customer and equipment support.

How to use this manual

Four publications are available to assist you in setting up, operating maintaining and servicing the FJ Printer:

- ***FJ Printer Quick Start Guide*** (or ***StudioJet Quick Start Guide****)
- ***FJ Printer & StudioJet User Guide***
- ***FJ Printer Service Manual***
- ***FlexPlot User Guide***

Where to find information

The table below provides a quick directory of topics and resources:

Topic	Manual
Assembly & setup	***Quick Start Guide***
Paper loading	***Quick Start Guide***
Removing markers	***User Guide***
The Ioline **Control Center (**adjusting plot parameters)	***User Guide***
Ioline **FlexPlot** software	***FlexPlot User Guide***
Design software set-up guides	***FlexPlot User Guide***
Maintenance	***User Guide***
Basic troubleshooting	***User Guide***
Advanced troubleshooting for qualified service personnel	***FlexPlot Service Manual***
Specifications, part names, drawings	***FlexPlot Service Manual***

What's in this *Service Manual*

The ***FJ Printer & StudioJet Service Manual*** provides extensive product specifications, testing and repair procedures.

Chapter 1 Introductory information and general specifications.

Chapter 2 Descriptive drawings listing part names for the FJ Printer. This section is intended to supplement the ***FJ Printer User's Guide***.

Chapter 3 Troubleshooting and testing guide.

Chapter 4 Details for repair and maintenance of the FJ Printer.

Chapter 5 Technical drawings and reference material.

Note

*The **FJ Printer** and **StudioJet** have separate ***Quick Start Guides***. When directed to consult the ***Quick Start Guide***, please select the publication relevant to your Ioline product.

KEY

A.	Left End Cover	**F.**	Feed Roll
B.	Pinchwheel lever	**G.**	Take-up Shaft
C.	Right End Cover	**H.**	Feed Shaft
D.	Take-up Motor	**I.**	Dancer Bar
E.	Stand Leveling Foot	**J.**	Stand

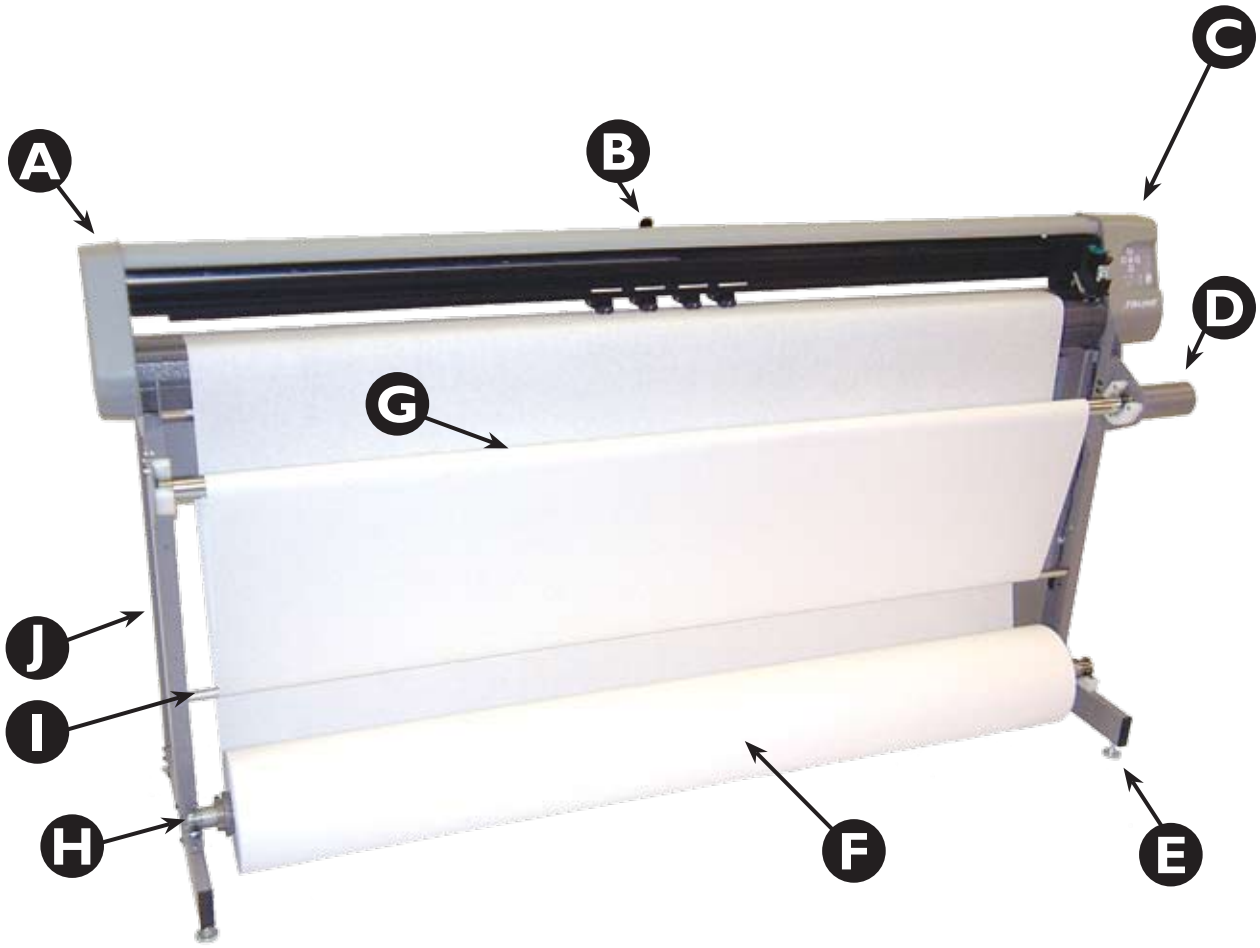


Figure 2. The Ioline FJ (shown) and FJeX (not shown) Printers Front View.

KEY

K. Take-up Motor Cable
L. Take-up Motor Outlet
M. Power Switch
N. Serial & USB Ports
O. Paper Out Sensor
P. Platen Leveling Pad
Q. Cross-member*

*The FJ-eX has two cross-members

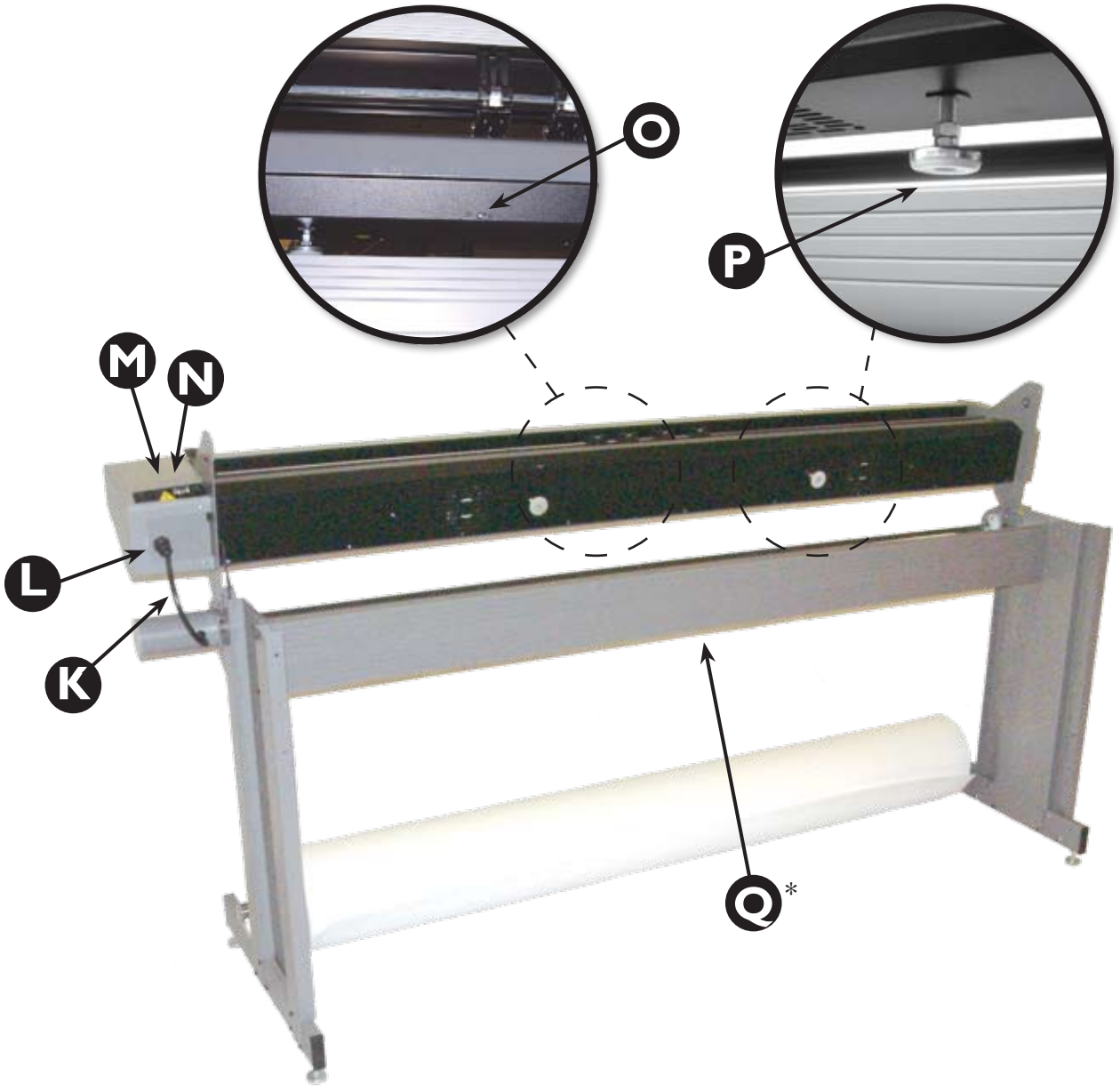


Figure 3. The Ioline FJ (shown) and FJeX (not shown) Rear View (head titled in maintenance position.)

KEY

R. Drive Shaft Marker
S. Pinchwheel Lever
T. Pinchwheel
U. Traverse or Carriage Rail
V. Carriage Assembly
W. Platen
X. Ink Cartridge Latch
Y. Ink Cartridge Stall
Z. Keypad
AA. Service Station
BB. Bottom Sensor
CC. Top Sensor

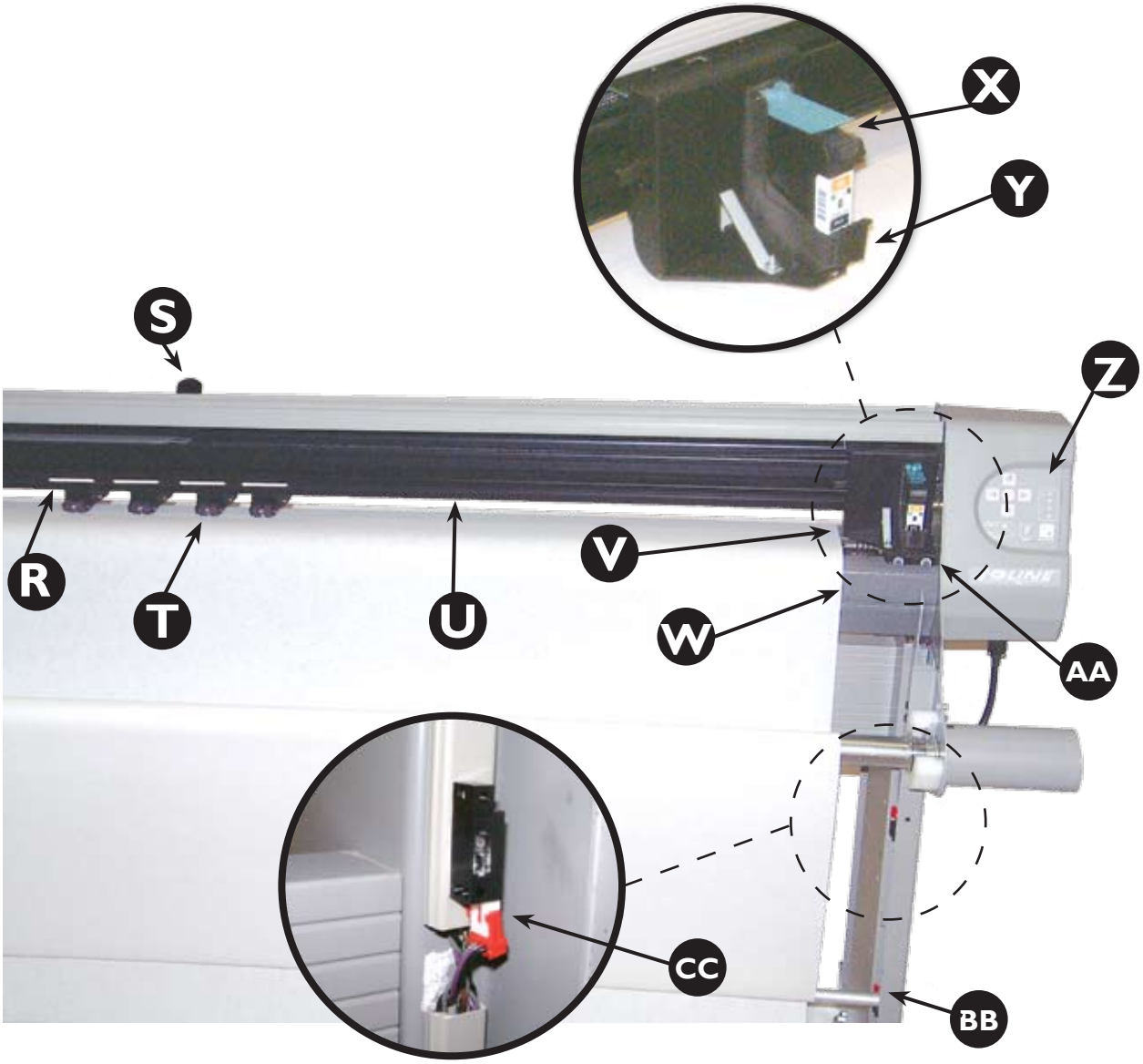


Figure 4. The Ioline FJ Printer Front View Close-up

KEY

- **A.** Left End Cover
- **B.** Drive Shaft Marker
- **C.** Pinchwheel Lever
- **D.** Pinchwheel
- **E.** Drive Shaft
- **F.** Right End Cover
- **G.** Keypad
- **H.** Stand Leg
- **I.** Inkjet Cartridge
- **J.** Carriage
- **K.** Stand Leveling Foot
- **L.** Feed Shaft
- **M.** Cross-member
- **N.** Platen
- **O.** Traverse

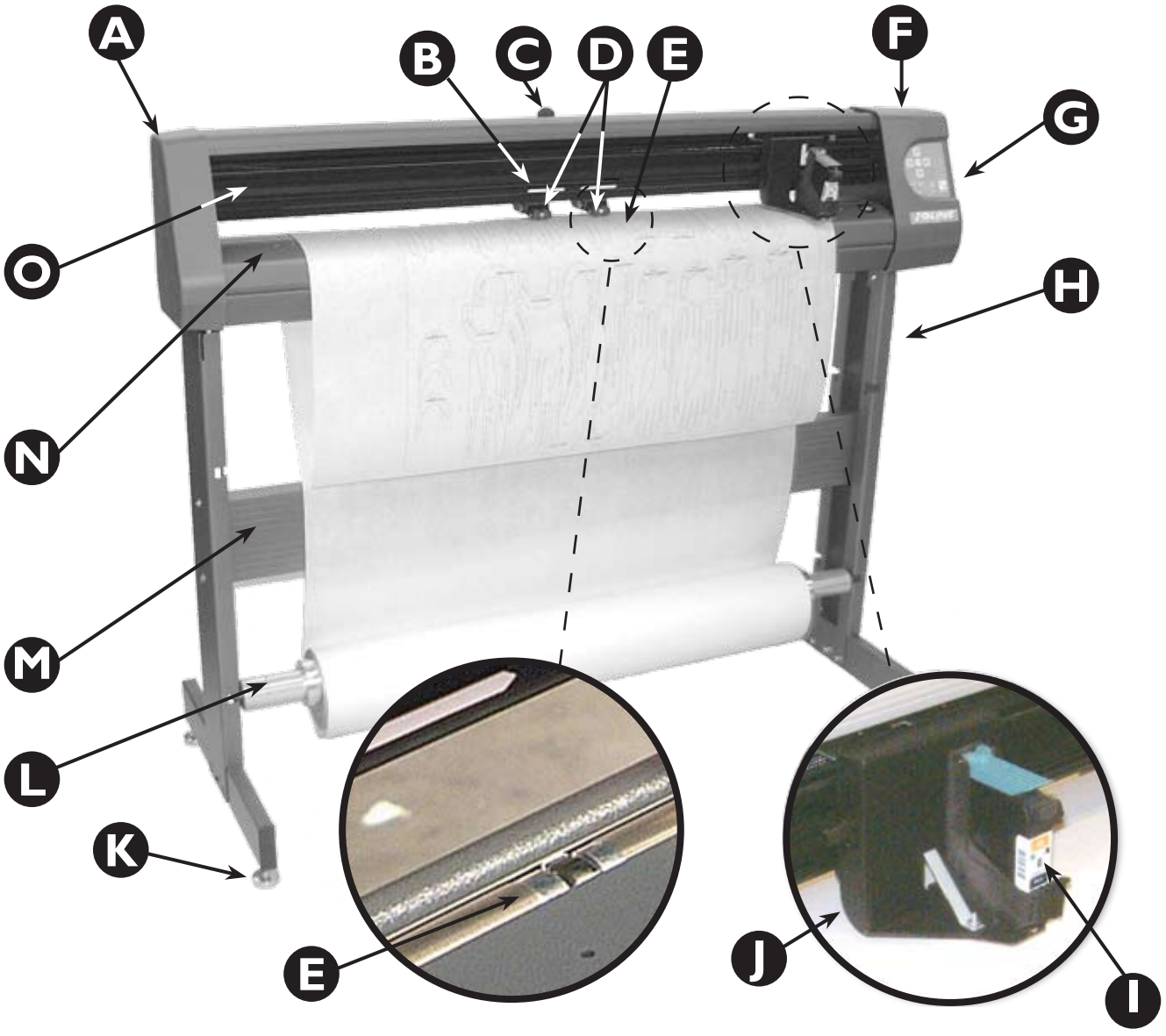


Figure 5. The Ioline StudioJet Front View.

KEY

P. Power Switch
Q. Serial (COM) Port
R. Power Cord

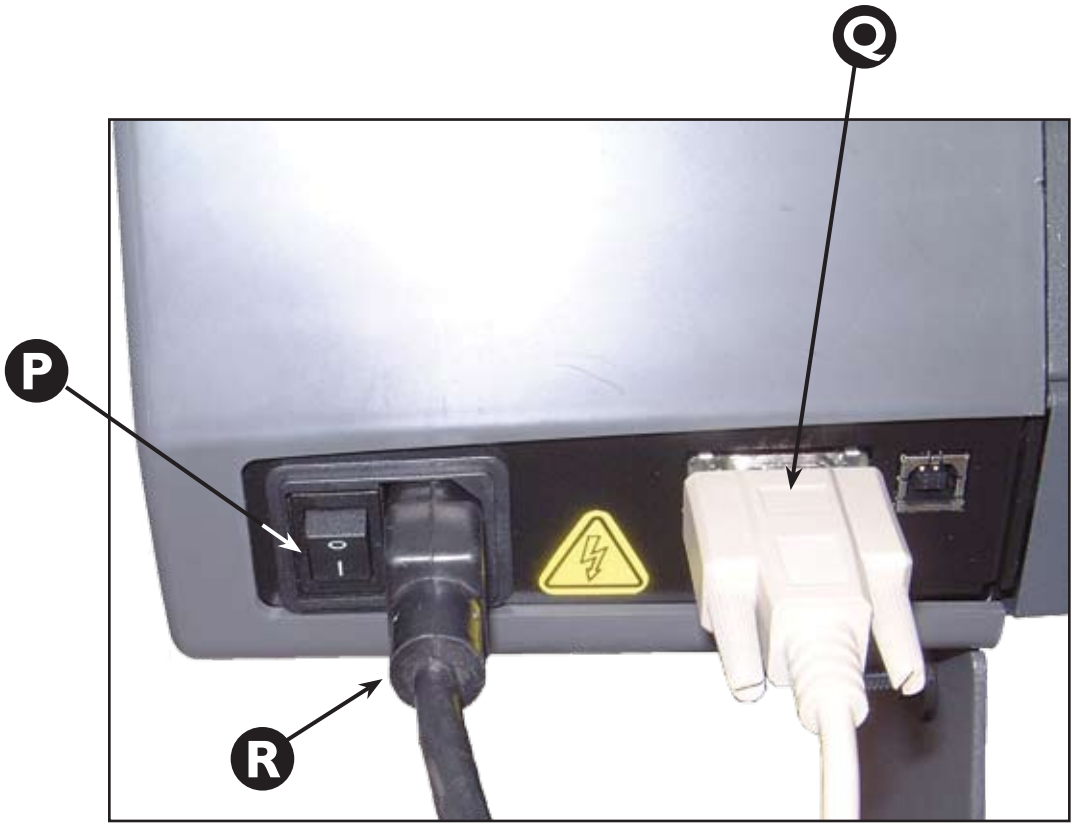


Figure 6. Power and communications ports on the Ioline StudioJet are located on the back of the right cover.

Chapter 1

Overview

Product overview

Figure 7. The Ioline FJ Printer.

The FJ Printer is most commonly used in conjunction with popular apparel software for printing marker patterns, used in the manufacture of clothing. The Printer also comes with **FlexPlot** software that allows printing of the most popular formats such as AutoCAD® (DXF), CorelDraw!® (PLT), Adobe® Illustrator® (DXF), Lectra® (ASTM), Investronica® (ASTM). In addition, it plots direct to Gerber® and reads Gerber®-compatible file formats (STD, PLT or ASTM).

The Ioline FJ Printer can handle many different printing operations up to 72 inches wide and 600 yards long (85.8 inches and 349.9 yards for the FJ-eX; 44 inches and 600 yards for the StudioJet. Two industry standard printer languages (HPGL 7475, and DM/PL) are supported.

The Ioline FJ Printer also supports direct cable connection from many popular programs such as PAD®, Scanvec® Optitex®, Polytropon®, Ioline IPS software, and other applications.

Supported languages

Language	Application
HPGL	Direct from software or Ioline FlexPlot.
DM/PL	Direct from software or Ioline FlexPlot.
DXF	Ioline FlexPlot only.
STD	Ioline FlexPlot only.
ASTM 6959	Ioline FlexPlot only.
Ioline syntax	Direct special control characters for FJ Printer.

FJ Printer Specifications

	Metric	Empirical
Throughput	42[2] m/hour	50[2] lineal yd/hour
Max. plotting width	1.83 m	72 in
Media width min. max.	 .91 m 1.88 m	 36 in 74 in
Marker length	548.6 m (Unattended)	600 yds (Unattended)
Floor space requirements Height Width Depth	2.4 m x .7 m .7 m 2.3 m 1.17 m	96 in x 26 in 27.5 in 90.5 in 46 in
Weight Actual Dimensional (US) Dimensional (Int'l)	 106 kg 156 kg 158.2 kg	 234 lbs 344 lbs 348.8 lbs
Paper type	Recycled to bond	
Feed roll position	Front floor loading	
Paper take-up roll position	Ergonomic waist-level off-loading from front	
Line thickness	Thin, normal or thick	
Resolution Best mode: Draft mode:	 600 dpi 300 dpi	
Ink cartridges	Off-the-shelf HP® 51645A cartridges	
PC interface	USB / Serial (RS-232)	
Protocol	HPGL / DM/PL	
Languages	DM/PL, DXF, HP-GL, HP-GL/2, MicroJet STD, ASTM	
Compatibility	Gerber® (Accumark®, MicroMark®, and Micro-dynamics®), Assyst®, AutoDesk® (AutoCAD®), Investronica®, IPS, Lectra®, Scanvec® (Optitex®), PAD®, Polygon®, Polytropon® (PolyPattern®), Vetigraph® and others	
Power requirements	85-264 VAC, 0.25 KVA, Single phase, 47-440 Hz	
Humidity	Non-condensing	
Warranty	1-year parts and labor	

FJ-eX Specifications

	Metric	Empirical
Throughput	45[2] m/hour	54[2] lineal yd/hour
Max. plotting width	2.18 m	85.8 in
Media width min. max.	 1.2 m 2.18 m	 47 in 85.8 in
Marker length	320 m (Unattended)	349.9 yds (Unattended)
Floor space requirements Height Width Depth	2.62 m x .7 m .7 m 2.6 m 1.17 m	103 in x 27.5 in 27.5 in 102.3 in 46 in
Weight Actual Dimensional (US) Dimensional (Int'l)	 125 kg 180 kg 190 kg	 276 lbs 397 lbs 418.9 lbs
Paper type	Recycled to bond	
Feed roll position	Front floor loading	
Paper take-up roll position	Ergonomic waist-level off-loading from front	
Line thickness	Thin, normal or thick	
Resolution Best mode: Draft mode:	 600 dpi 300 dpi	
Ink cartridges	Off-the-shelf HP® 51645A cartridges	
PC interface	USB / Serial (RS-232)	
Protocol	HPGL / DM/PL	
Languages	DM/PL, DXF, HP-GL, HP-GL/2, MicroJet STD, ASTM	
Compatibility	Gerber® (Accumark®, MicroMark®, and Micro-dynamics®), Assyst®, AutoDesk® (AutoCAD®), Investronica®, IPS, Lectra®, Scanvec® (Optitex®), PAD®, Polygon®, Polytropon® (PolyPattern®), Vetigraph® and others	
Power requirements	85-264 VAC, 0.25 KVA, Single phase, 47-440 Hz	
Humidity	Non-condensing	
Warranty	1-year parts and labor	

StudioJet Specifications

	Metric	Empirical
Throughput	33[2] m/hour	33.37[2] lineal yd/hour
Max. plotting width	1.01 m	40 in
Media width min. max.	 .2 m 1.11 m	 8 in 44 in
Marker length	548.6 m (Unattended)	600 yds (Unattended)
Floor space requirements Height Width Depth	2.4 m x .7 m 1.17 m 2.26 m .66 m	96 in x 26 in 46 in 89 in 26 in
Weight Actual Dimensional (US) Dimensional (Int'l)	 53 kg 54 kg 53.1 kg	 116 lbs 117 lbs 117.1 lbs
Paper type	27# recycled to 150 lb tag board	
Feed roll position	Front floor loading	
Paper take-up roll position	Ergonomic waist-level off-loading from front	
Line thickness	Thin, normal or thick	
Resolution Best mode: Draft mode:	 600 dpi 300 dpi	
Ink cartridges	Off-the-shelf HP® 51645A cartridges	
PC interface	USB / Serial (RS-232)	
Protocol	HPGL / DM/PL	
Languages	DM/PL, DXF, HP-GL, HP-GL/2, MicroJet STD, ASTM	
Compatibility	Gerber® (Accumark®, MicroMark®, and Micro-dynamics®), Assyst®, AutoDesk® (AutoCAD®), Investronica®, IPS, Lectra®, Scanvec® (Optitex®), PAD®, Polygon®, Polytropon® (PolyPattern®), Veti-graph® and others	
Power requirements	90-264VAC, 0.25 KVA, Single phase, 47-66 Hz, 80W	
Humidity	Non-condensing	
Warranty	1-year parts and labor	

How the printer works

The Ioline FJ Printer combines paper and ink cartridge motion to create vector outputs in a wide 72 in format. The data are sent to the printer via either a standard RS-232 serial or USB cable. When a file is sent to the printer, the electronic system translates the vectors into instructions for the "X" (paper motion) and "Y" (Ink cartridge motion) motors. At the same time instructions are sent to the carriage assembly to apply ink to the paper.

Paper movement

Paper motion is accomplished by pulling paper through the machine with a traction shaft. The shaft is connected to the X-axis motor with a timing belt transmisison assembly. The drive-shaft rotates in one direction.

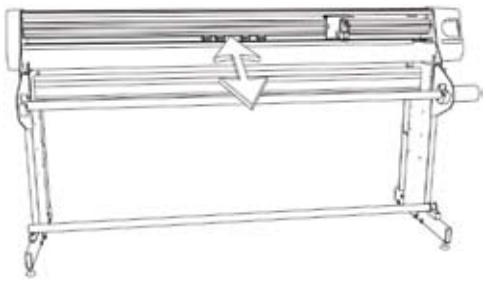


Figure 8. Paper direction.

Carriage movement

The Y-Axis transmission powers a timing belt that transports a V wheel carriage along the Y-Axis traverse extrusion. The ink cartridges are attached to the carriage and are made to apply ink to the paper by actuating the electronics of the ink cartridge. When not printing, the carriage assembly is stored in the **Service Station** to keep the ink cartridges clean and capped so they don't dry out.

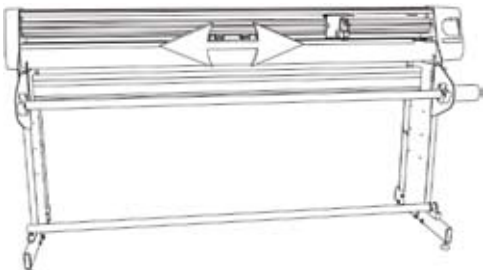


Figure 9. Carriage movement.

Serial number identification

Identification of Ioline Corporation products is accomplished by use of a serial number located on the back of the right side cover on the printer. You can determine the model and date of manufacture using the following guidelines:

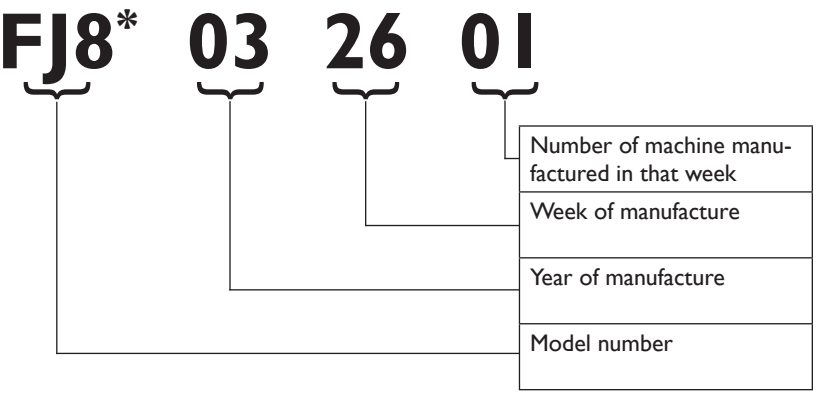
Note

* FJ-eX model serial numbers begin with the code "FJEX":

FJEX

StudioJet models begin with "STUDIOJET":

STUDIOJET



Glossary

BOM	Bill(s) of Material for Assembly
Bottom Pan	Metal housing protecting the underside of the printer.
Carriage	The component that holds the ink cartridges. It traveles along the Y-Axis on the traverse assembly.
Keypad	Where the user controls simple printer functions. Carriage and media motion is accessible from here during stop mode.
Traverse Assembly	The structure that supports and guides the carriage assembly.
X-Axis	The direction of the paper moving through the machine.
Y-Axis	The direction of the carriage moving back and forth.

Software setup options

Ioline recommends using **FlexPlot** for marker making on the FJ Printer. **FlexPlot** offers the most robust and flexible workflow available for creating output. It's especially useful when many file formats are used, a common situation for service bureaus. To set-up and learn how to use the software, *see the* ***FlexPlot User Guide***.

The FJ Printer is designed to work in many different production environments. The type of marker printing you do will often determine your preferred communication method. Two typical methods for sending markers are:

1. **Plot directly from the marker or design software to the printer.** ***(See Figure 10.)***

   Unlike other marker printers, the FJ Printer is capable of operating as a stand-alone device with no extra software running on the computer. This method works if your CAD software includes a driver for any Ioline product, such as the Ioline 600Ae or the Summit 2200. It will also work if the CAD software can create a compatible HPGL- or DM/PL- formatted file.

Note

An expanded Glossary is available in the ***User Guide***.

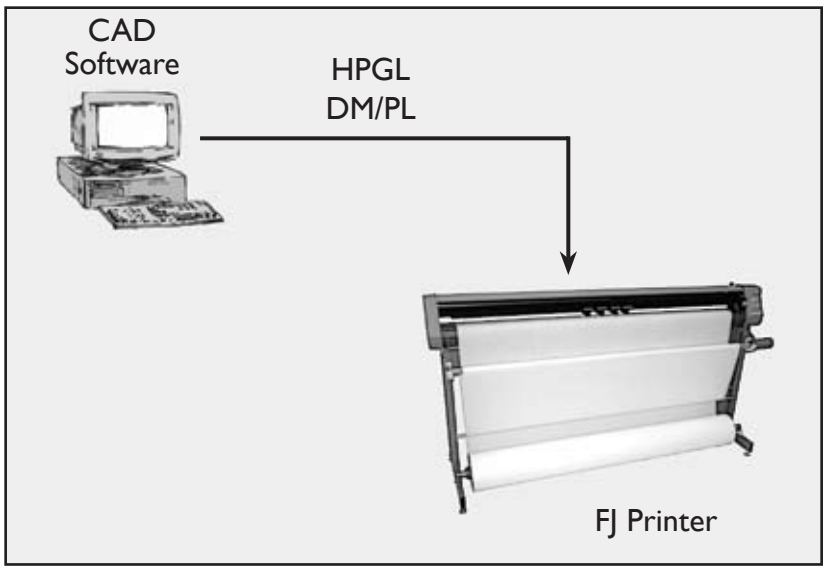


Figure 10. Workflow: output direct from CAD software (without FlexPlot).

2. Use FlexPlot software to convert files before sending them to the printer for output.

The FJ Printer includes the **FlexPlot** software which will convert many compatible file formats. It also provides an advanced marker queue management system and other tools to optimize the performance of the printer.

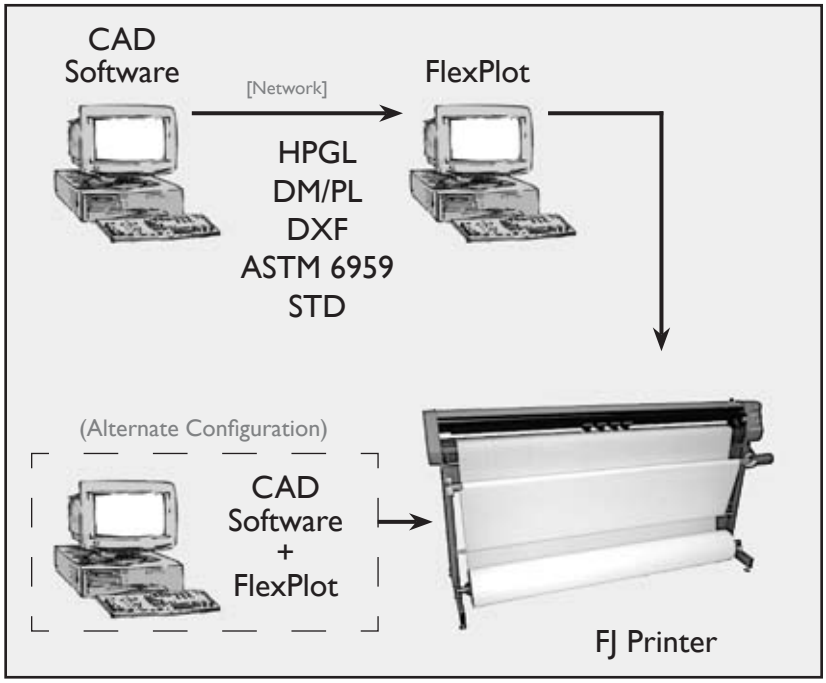


Figure 11. Workflow using **FlexPlot** for file conversion and output.

CAUTION

Keep hands and loose clothing away from all moving parts of the printer. Make sure the **Service Station** area is not obstructed.

Power on

Turn on the computer and the printer to make sure they both work. The printer power switch is located next to the power cord on the back of the machine, behind the keypad. When the printer is powered up, the carriage will move toward the left side of the machine, then return to the opposite side to park in the **Service Station**. The **OK** light will turn red and the **Square** light will turn green on the front panel after the start-up process has finished.

Installing FlexPlot and the Control Center

The FJ Printer includes two software interfaces: **FlexPlot** and the **Control Center**. **FlexPlot** will import and queue marker files from many design programs to optimize production operations. The **Control Center** is an interface for adjusting parameters to optimize printer performance. The printer comes with a CD-ROM which has Microsoft Windows® 98/2000/XP versions of the programs as well as PDF user guides and the required Adobe® Acrobat® reader.

1. Power on the computer and Windows®.
2. Insert the Ioline CD-ROM into the CD-ROM drive (usually D:).
3. The installation program should start automatically. If it does not:
   a. Select the **Start** button.
   b. Choose ***Run***.
   c. Type ***D:\IOSETUP*** (substitute the correct letter if the CD-ROM drive letter is not ***D:***) and Click **OK**.
4. Follow the instructions that appear on the screen.
5. The ***FlexPlot User Guide*** has details on using the **FlexPlot** software. In this manual, see the section ***The Control Center*** for more details about the **Control Center** software.

The Control Center

Overview

The **Control Center** is a utility program that does two things:

- Allows you to adjust settings to tailor output (e.g. scale, line width) from the computer.
- Provides an interface to send completed files to the printer.

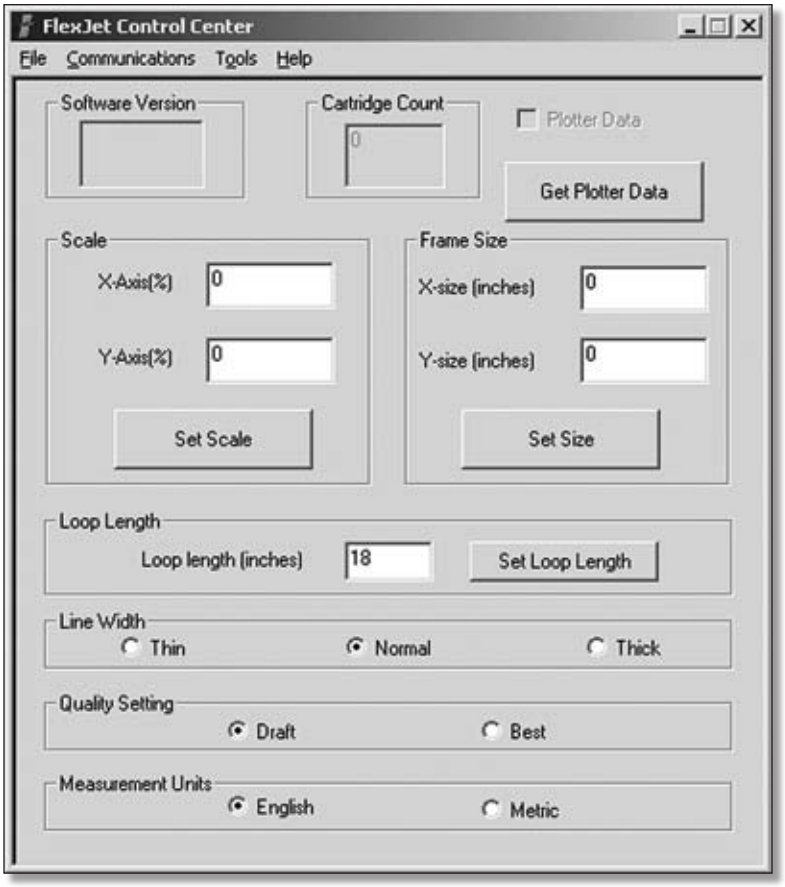


Figure 12. Control Center main menu.

Changing system settings

A variety of settings are adjustable to fit specific needs:

- Make sure the printer power is on and that the initialization process is complete. The carriage will park, the keypad **OK** light will turn red and the **Square** light will turn green.
- The **Screen Menu** displays the primary settings that are adjustable. The **Menu Bar** contains utilities for setting up the **Control Center** and calibrating the pinter.
- Changes only take effect after one of the **Send** buttons is pushed.

Note

To avoid communication port conflicts, do not simultaneously run more than one application that communicates with the printer.

Control Center menu bar features

File

Download Firmware	Allows the user to download the latest firmware version. *See the **User Guide** for more information.*
Send Plot File	Print a PLT or PLX file.
Exit	Exit the **Control Center**.

Communications

Settings	Select the COM port and baud rate to match the printer.
Send Command	Permits advanced users to manually enter commands.

Tools

Aux Sensor	Stops printer when paper runs out.
Cartridge Calibration	Displays tools to adjust print cartridge alignment. *See the **User Guide** for more details.*
Size Calibration	Allows adjustment of the size calibration settings. *See the **User Guide** for more details.*
About Your FlexJet	Displays license information and print head activation status.
FlexJet Licensing	Enter new license information for upgrades in this window.

Help

About	Displays **Control Center** version information.

Control Center menu options

Software Version

Displays the current firmware version installed in the printer.

Cartridge Count

Displays how many cartridges are in active use by the printer.

Get Plotter Data

Reads and displays the current settings stored in the printer in the input boxes.

Plotter Data (check box)

Indicates when the displayed settings were successfully downloaded from the printer. If this box is unchecked, the **Control Center** was unable to connect with the printer and cannot display current settings. Check the connections, baud rate and COM port. Press the **Get Plotter Data** button to attempt to download settings if the process failed during startup.

Line Width

Controls the weight of the plotted line using line width. Three levels are available; **Thin**, **Normal**, and **Thick**. Thin lines use less ink and make fine details like Asian text and small pieces easier to see. Thick lines use more ink to produce higher contrast lines.

Used in conjunction with the **Quality Setting** (*see below*), the FJ Printer provides six options for output quality, to enable you to produce clearly visible lines using the least possible amount of ink.

Scale

The printer scale ranges from 1% to 999%. The factory default **Scale** is 100%. A scale set to 50% prints at half size. Changes do not take effect until the **Set Scale** button is pressed. Note: Both X- and Y-Axes are set independently.

Frame Size

Most design software sends long plots to printers by breaking them into smaller pieces called *frames*. In general, design software does this automatically and adjusts the **Frame Size** in the printer to match. The **Frame Size** setting establishes clipping limits for each data frame. If the printed size of a plot frame exceeds the frame size set in the printer, the excess is clipped or thrown away. (If the plot is clipped, try increasing the **Frame Size** manually.) The factory-set X-axis (paper direction) frame size is 46 in (116.8-cm), maximum is 21600 in (54,864-cm). Default and maximum Y-axis (carriage direction) frame size is 72 in (182.9-cm).

Quality Setting

Choose **Draft** or **Best** to control line density. **Draft** mode uses 300 DPI. **Best** mode uses 600 DPI. A lower DPI setting uses less ink by creating a fainter line. Higher DPI uses more ink but makes a darker line. Use this setting in conjunction with the **Line Width** (*see above*) to find a balance between saving ink and making clearly visible lines.

Measurement Units

Choose between English or Metric units for settings display.

CHAPTER 2

Nomenclature

Product components

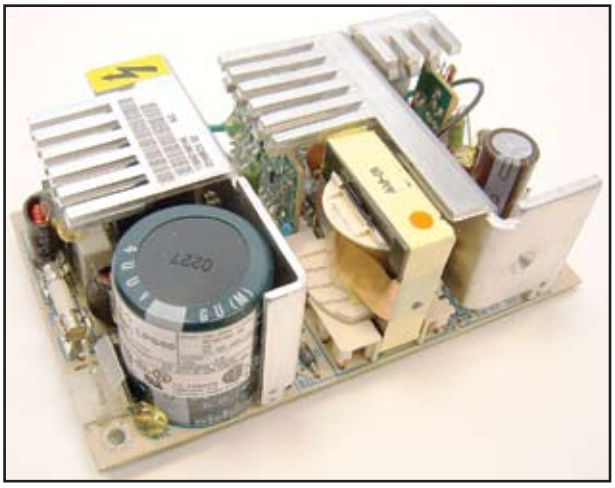


Figure 13. The Ioline FJ Printer power supply.

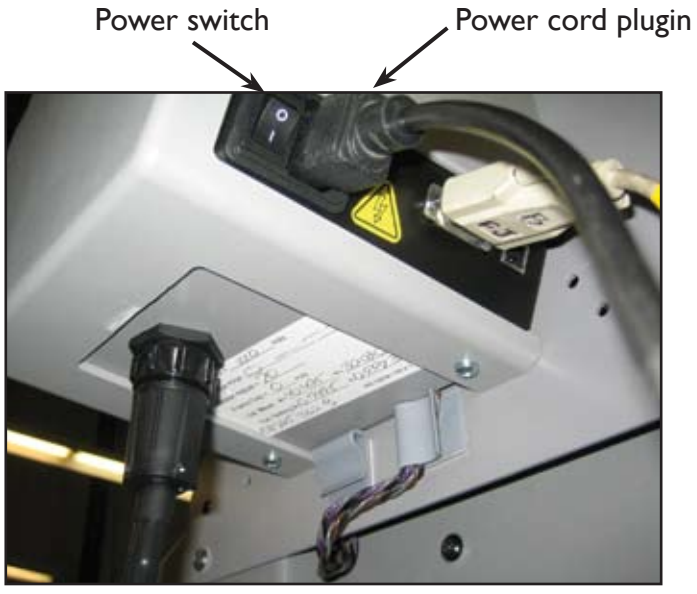


Figure 14. Rear power panel assembly.

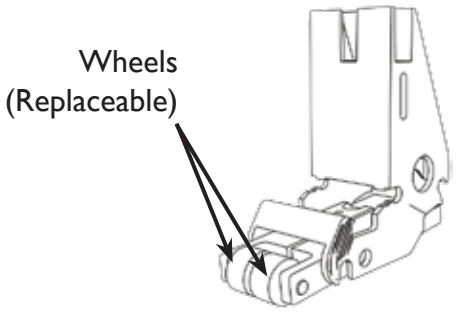


Figure 15. Pinchwheel assembly.

Figure 16. Ink cartridges: HP 51645A.

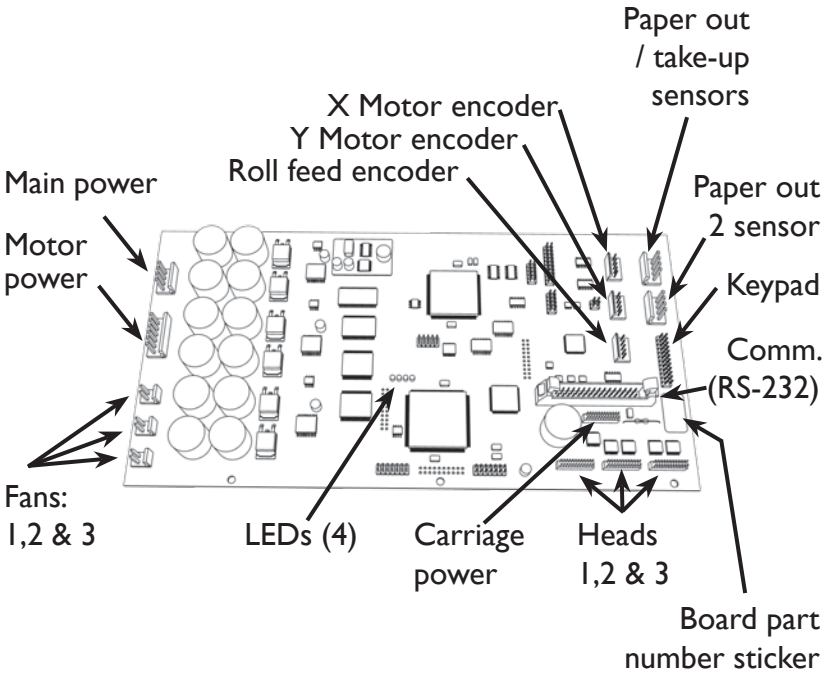


Figure 17. FJ Printer logic board.

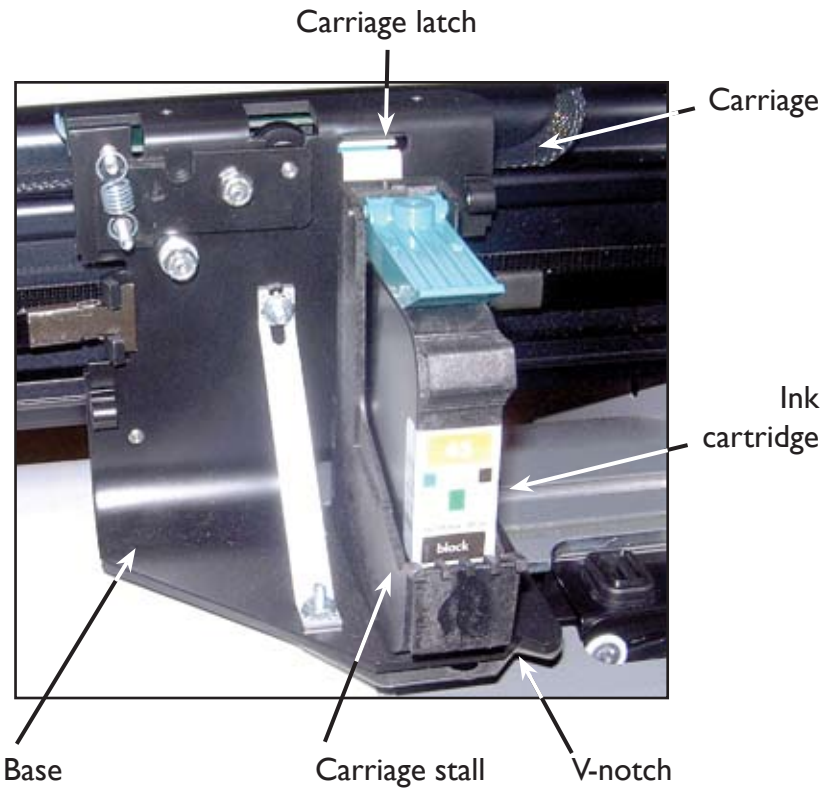


Figure 18. Printer carriage assembly with cover off.

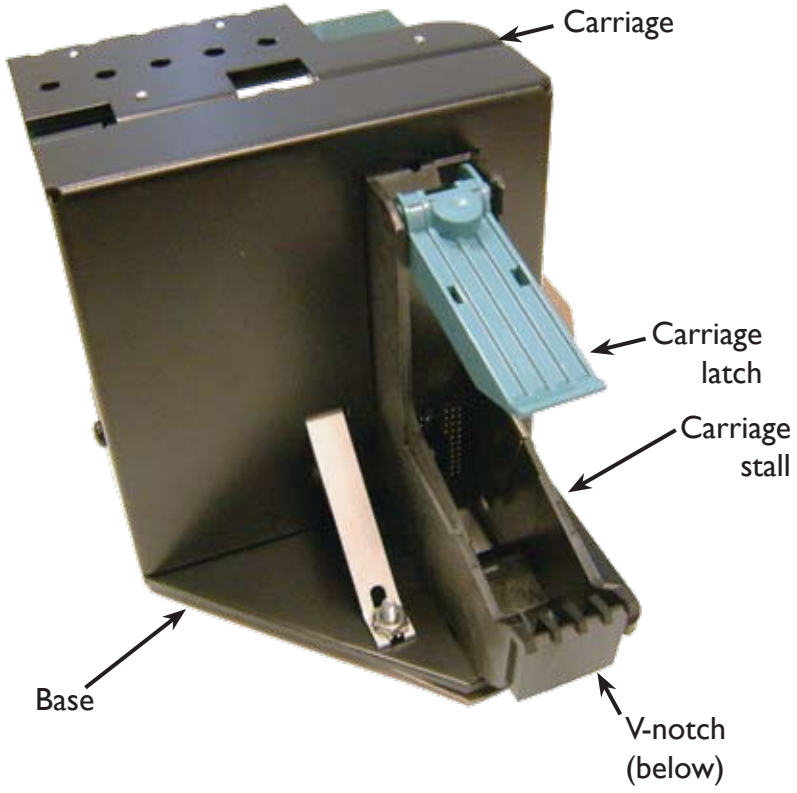


Figure 19. Printer carriage assembly with cover on.

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Chapter 3

Troubleshooting & Testing

General troubleshooting

This section contains guidelines and testing procedures for resolving basic operatioinal difficulties and diagnosing mechanical, electrical and electronic processes. ***Chapter 4*** also contains related repair procedures.

If the system isn't functioning correctly, first determine which component is causing the problem. Likely difficulties may involve:

- **The computer**
- **The power cord or communication cables**
- **The apparel/marker design software**
- **The FJ Printer**

Changes to the computer operating system or the installation of new peripherals or software can cause conflicts. If the problem appears to be with the computer or apparel design software, consult the appropriate documentation or an Ioline dealer.

If the problem is with the printer, begin by making sure power is on and that the cable between the machines and the PC is connected correctly.

The information in this chapter begins with the simplest and most common issues, and progresses to more complex and invasive troubleshooting. If you are unable to resolve a problem after consulting this manual, fill out the ***Diagnostic Record*** at the beginning of ***Chapter 4***, then contact Ioline Customer Service.

Error messages

Error messages that are specific to the Ioline FJ Printer are divided into two catagories: **Control Center** software errors and LED codes. Software errors present themselves on the computer screen and usually indicate a communication problem. LED codes are visible on the keypad and can be a green light, a red light or a combination of both.

The keypad LED code table (**Figure 21**) is helpful for isolating the cause of obvious external or communication problems. Comprehensive information later in the chapter can help troubleshoot mechanical and electrical difficulties. Errors caused by the operating system or the plotting software should be resolved with the software author.

Control Center software errors

The FJ Printer did not respond. Do you wish to continue anyway?

The **Control Center** did not get a response from a FJ Printer on the COM port it is currently configured to use. If the FJ Printer is connected and the power is on, click '*Yes*'. Follow the directions in the ***FJ Printer User Guide*** for configuring the COM port and baud rate.

Unable to open communication port. You may need to select a different COM port. Do you wish to continue?

The **Control Center** did not get a response from a FJ Printer on the COM port it is currently configured to use. If the FJ Printer is connected and the power is on, click '*Yes*'. Follow the directions in the ***FJ Printer User Guide*** for configuring the COM port and baud rate.

Incorrect plotter model. Do you wish to continue?

The **Control Center** did not recognize the printer model connected to the COM port. Upgrade the **Control Center** to the latest version. If that does not resolve the problem, confirm that '*FJ Printer Control Center*' is displayed in the menu bar of the program. If it is not, obtain the correct version from Ioline.

Fatal Error: COM port pointer is NULL Unable to recover.

A serious internal failure in the program or Windows® has occurred. Close all programs, restart Windows® then start the **Control Center** program.

Unable to change FJ Printer baud rate Do you wish to change baud rate in Control Center?

The **Control Center** did not get a response from a FJ Printer on the COM port it is currently configured to use. If the FJ Printer is connected and the power is on, click '*Yes*'. Follow the directions in the ***FJ Printer User Guide*** for configuring the COM port and baud rate.

Warning: Unable to open log file; Status messages will not be saved.

This error occurrs if the **Control Center** is unable to write the firmware upgrade process log in the same folder where the firmware source file is stored on the PC. It is typical if installing firmware from a CD-ROM or if the user does not have '*Modify*' or '*Full*' permissions to the PC file system. Copy the firmware to the hard disk and make sure permissions are correct before installing.

NOTICE: Your firmware is out of date. It is recommended that you update it as soon as possible, but it is not required. This program will work with new and old firmware. Firmware upgrades are available from Ioline Customer Service at (425) 398-8282 Pacific Standard Time USA.

The firmware in the FJ Printer is obsolete. An upgrade is highly recommended. Contact Ioline Customer Service to obtain the software and instructions.

FJ Printer is not responding. Please check your cables and baud rate.

The **Control Center** did not get a response from a FJ Printer on the COM port it is currently configured to use. If the FJ Printer is connected and the power is on, click '*Yes*'. Follow the directions in the ***FJ Printer User Guide*** for configuring the COM port and baud rate.

The identification numbers for this board have already been set. You must use the '*Reset Machine ID*' dialog to change them now.

The user is attempting to overwrite an internal license that is already set. Contact Ioline customer service for assistance.

Keypad error codes

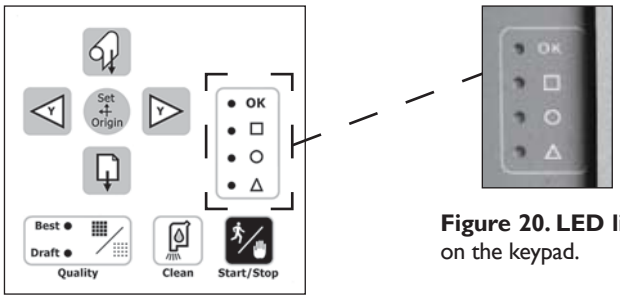

Figure 20. LED lights on the keypad.

Legend

G = Green light
R = Red light
Y = Yellow light
Y-Blink = Blinking yellow light*
OFF = Unlit

OK	■	●	▲	Problem/Status
G	OFF	OFF	OFF	Ready to Print, Origin Set
R	OFF	OFF	OFF	Paused / Offline, Keypad Active
R	G	OFF	OFF	Power-on reset finished.
R	OFF	Y-Blink	OFF	Paper Feed Out / Jammed
Y-Blink	R	R	OFF	X- (paper) axis jam
Y-Blink	G	R	OFF	Y- (carriage) axis jam
Y-Blink	G	G	OFF	TU (take-up) jam
OFF	R	Y-Blink	OFF	Buffer Overflow
Y-Blink	OFF	R	OFF	Init from EPROM failed
OFF	R	R	OFF	File syntax error
Y-Blink	Y-Blink	Y-Blink	OFF	Printer ready to receive firmware
Y-Blink	OFF	OFF	OFF	Motors off / System Stop

Figure 21. Keypad LED error codes.

* First generation FJ Printer keypad lights do not blink.

Note

If keypad errors are not shown on the chart to the right, update the firmware. For more information, please contact Ioline Customer Service.

Power problems

If the printer won't power on or initialize—or if the fan does not spin—follow these initial diagnostic steps:

1. Check the power cord. Make sure that it is firmly plugged into the wall and into the back of the printer.
2. Check the voltage at the wall outlet and verifiy that it is within the operating limits as specified in ***Chapter 1***, ***Specifications***.

If there are no obvious power problems, proceed to the ***Mechanical, Electrical, and Electronic Diagnostics*** later in this chapter.

Communications

The Printer won't respond to the computer

If the printer doesn't accept commands from the computer, try the following:

1. Verifiy that the communication cable is correctly connected to the printer and to the proper communications port on the computer.
2. Change the computer COM port settings to match the printer's serial communications settings. (*See* ***Serial Communication****, below.*)

Serial communication

The serial port on the printer has an adjustable baud rate. Available speeds are 9600, 19200, 38400, 57600, and 115200. It is critical that the **Control Center**, **FlexPlot** or design software use the same baud rate that the printer is using.

If there is ever any doubt about what baud rate the printer is using, Ioline recommends resetting it to the default of 38400. To reset the baud rate:

1. Turn off the power to the printer.
2. Press and hold the **Page Advance** key (the key below **Set Origin**) while turning power on.
3. Continue holding the **Page Advance** key until the **OK** light turns red and the **Square** light turns green.

If using a terminal program like TeraTerm™ to communicate with the printer, make sure to use ***8*** Data Bits, ***No Parity***, ***1*** Stop Bit, and ***Xon/Xoff*** (software) Flow Control.

Common problems

Good print quality is dependant upon several factors. The type of paper, environmental conditions, and operator habits are only a few of the variables that can affect the quality of the plot.

It is important to load paper in the printer—and maintain it—according to the guidelines in the ***User Guide***. The table below summarizes the some of the most common difficulties users encounter. The sections following the table examine each issue in greater depth.

A marker plot doesn't start at the correct point on the paper	
Cause:	**Solution:**
1. The origin is not set correctly.	1. Position the V-notch where the plot should start. Press the **Set Origin** key.
Poor line quality.	
Cause:	**Solution:**
1. Ink cartridge is improperly installed.	1. Remove and reinstall ink cartridge.
2. Frame Gap setting is incorrect.	2. Use the **Control Center** to adjust frame gap as shown in the ***Routine Maintenance*** chapter of the ***FJ Printer User Guide***.
3. Carriage electronics or cables are damaged.	3. Contact Ioline customer service.
4. Ink cartridge is dry.	4. Clean or replace cartridge.
The printer does not complete the marker.	
Cause:	**Solution:**
1. Outdated software.	1. For updated firmware, please contact Ioline Customer Service.
2. The frame/panel size is mismatched between the printer and the design software.	2. Check the panel size in the software. It should be equal to the printer panel size.
Take-up shaft stops turning; No take-up during plotting.	
Cause:	**Solution:**
1. Paper sensor or motor failed.	1. Contact Ioline customer service.
When paper is out, machine keeps plotting.	
Cause:	**Solution:**
1. Paper sensor failed.	1. Contact Ioline customer service.

Regular or intermittent paper tearing or paper bunches up at bottom.	
Cause:	**Solution:**
1. Front dancer bar is not installed.	1. Install front dancer bar.
2. Paper gets "yanked" by the machine during take up.	2. Make sure the front dancer bar is below the Take-up Sensor, then press **Set Origin**.
3. Paper buckles when plotting to floor.	3. Clear paper path. Refer to the ***FJ Printer User Guide*** for proper loading procedures.
4. Paper roll damaged.	4. Inspect the feed paper roll. Dropping the paper roll on an end can wrinkle the edge which can catch the carriage and cause a tear.
5. Paper not loaded correctly.	5. Correct paper loading is vital. Follow the steps in the ***Operation*** chapter of the ***FJ Printer User Guide*** to reset paper alignment. Make sure the front silver dancer bar is BELOW the front optical sensor before plotting.
6. Platen not level.	6. Make sure the distance between the print heads and platen surface is the same at the right, center and left side of the printer. Adjust the platen levelers as described in the ***FJ Printer Quick Start Guide*** if necessary.
7. Outdated firmware does not advance paper at startup.	7. Use the **Control Center** to check the firmware version and ensure it is 324 or greater.
8. Pinchwheels press on a drive shaft bearing.	8. With power off, raise the pinchwheels and align them with the white driveshaft markers on the traverse.
9. Paper sensor failed.	9. Contact loline customer service.
When *Set Origin* is pressed, paper is pulled tight and rips.	
Cause:	**Solution:**
1. Paper sensor failed.	1. Contact loline customer service.
When *Set Origin* is pressed, paper runs quickly and stops.	
Cause:	**Solution:**
1. Motor failure.	1. Contact loline customer service.
Drive shaft refuses to move when keypad button is pressed.	
Cause:	**Solution:**
1. Machine is off or unplugged.	1. Turn on or plug in machine.
2. Motor failure.	2. Contact loline customer service.

Note

When changing paper rolls make sure you let the paper rest outside the packaging overnight first.

Jagged scan alignment.	
Cause:	**Solution:**
1. Cartridge alignment is incorrect.	1. Use the **Control Center** to adjust cartridge alignment as shown later in this chapter.
2. Motion alignment is incorrect.	2. Use the Control Center to adjust motion alignment as shown later in this chapter.
3. Platen or stand is not level.	3. Follow the directions in the ***FJ Printer Quick Start Guide*** to level the stand and platen.
4. Loose carriage pulley causing random/uneven gaps between scans.	4. Contact Ioline customer service.
Poor paper tracking.	
Cause:	**Solution:**
1. Paper is improperly loaded.	1. Reload and align paper.
2. Bad paper roll or paper quality.	2. Replace the paper roll.
3. Pinchwheels not in correct location.	3. With power off, raise the pinchwheels and align them with the white driveshaft markers on the traverse.
4 Feed paper roll isn't centered on feed shaft.	4. Center the paper roll on feed shaft. Make sure screws are tight on both paper hubs.
5. Loose paper hubs.	5. Tighten screws on the paper hubs.
No ink.	
Cause:	**Solution:**
1. Ink cartridge empty.	1. Replace cartridge.
2. Clogged print head.	2. Clean the print head, following the instructions under ***Cartridge Maintenance and Handling*** in the ***User Guide***.
3. Service Station failing to cap print head (FJ Printer only).	3. Contact Ioline Tech Support for assistance.
4. Broken ribbon cable.	4. Replace the ribbon cable following instructions under the ***Carriage Procedures*** section later in this chapter.
5. Logic board failure.	5. Contact Ioline customer service.

Gap between each scan, broken or dotted lines or sections of plot are missing.	
Cause:	**Solution:**
1. Frame gap setting is incorrect.	1. Use the **Control Center** to adjust frame gap as shown in the ***Routine Maintenance*** chapter of the ***FJ Printer User Guide***.
2. Ink cartridge is out of ink, dirty or the print head is plugged.	2. Check ink level indicator. Replace cartridge if indicator is black. If cartridge is not empty, see ***Cartridge Maintenance and Handling*** under the ***Routine Maintenance*** chapter in the ***FJ Printer User Guide***.
3. Ink cartridge is damaged.	3. Replace cartridge.
4. Ink cartridge bay pins are dirty.	4. Contact loline customer service.
5. Ribbon cable is loose or broken.	5. Tighten or replace the ribbon cable following instructions under the ***Carriage Procedures*** section later in this chapter.
6. Service Station refuses to cap cartridges (FJ Printer only).	6. Contact loline customer service.
7. Logic board failure.	7. Contact loline customer service.
After plot is sent, machine does not move.	
Cause:	**Solution:**
1. Plotter is off or unplugged.	1. Plug machine in and turn on.
2. Wrong baud rate or baud rate does not match on plotter or computer.	2. Refer to the ***Serial Communication*** section earlier in this chapter.
3. Wrong settings in the software.	3. Check the frame size and other settings in the software.
4. Data cable is bad.	4. Replace data cable.
5. Wrong port being used.	5. In the **Control Center**, verify that the assigned port matches the physical port.
6. Bad file.	6. Check or recreate the plot file.
7. Communication chip on plotter failed.	7. Contact loline customer service.
During power-up, carriage doesn't move or moves quickly to the left or right, then stops.	
Cause:	**Solution:**
1. Motor failure.	1. Contact loline customer service.

No power when printer is turned on; Keypad lights stay dark.	
Cause:	**Solution:**
1. The power cord is damaged or disconnected.	1. Check the power connection.
2. Check power supply voltage.	2. See ***Repair Procedures*** later in chapter 4.
3. The printer is damaged and needs professional service.	3. Contact an Ioline distributor or Ioline Customer Service.
4. A fuse has blown.	4. Replace fuse.
5. Power supply failure.	5. Contact Ioline customer service.
Pauses during printing.	
Cause:	**Solution:**
1. Vector density is very high due to fine detail or the design software is not using fonts embedded in the printer.	1. Reduce vector density, use embedded printer fonts, or increase communication baud rate.
2. Communication baud rate is set very low.	2. Increase baud rate from the minimum of 9600 baud to the default of 38,400 or higher. Make sure the FJ Printer and the software are set to the same baud rate.
3. Frame length is too big.	3. Reduce frame length. Set between 5-in and 35-in.
Carriage refuses to move all the way to the right.	
Cause:	**Solution:**
1. Service Station failure.	1. Contact Ioline Tech Support for assistance.
Carriage hits the Service Station.	
Cause:	**Solution:**
1. Service Station spring is broken.	1. Contact Ioline customer service.
2. Service Station slider sticks.	2. Contact Ioline customer service.
Take-up motor will not stop turning.	
Cause:	**Solution:**
1. Paper sensor failed.	1. Contact Ioline customer service.

Paper problems

Regular or intermittent paper tearing

Common situations that cause paper tearing while the printer is operating include:

- The paper was incorrectly loaded in the machine.
- A pinchwheel(s) is positioned over a drive shaft bearing.

Figure 22 represents the proper paper path, with the paper after it is inserted properly and taped to the take-up shaft. The illustration shows the dancer bar in place.

Note

The paper path and instructions for printing to the floor is illustrated in the ***FJ Printer User Guide***.

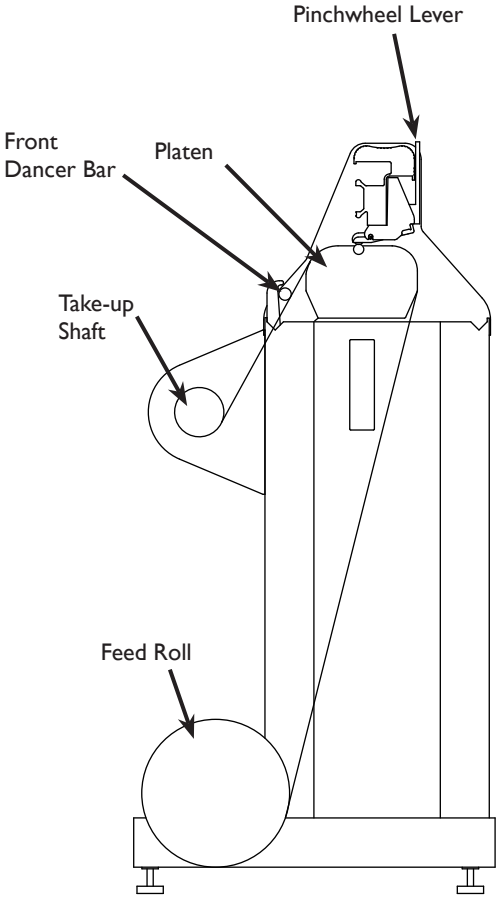

Figure 22. The correct paper feeding path on the Ioline FJ Printer.

Media tracking

Tracking is the process that controls media motion over the platen and assures accurate lines. If the paper slips under the pinchwheels or is out of alignment, printing quality will degrade. To resolve tracking difficulties try the following suggestions:

- Install paper correctly. *See the **Operation** chapter in the **User Guide** for more details*.
- Make sure the paper path and dancer bars are set correctly (as shown in **Figure 22** (and in the ***User Guide***.)
- Inspect the paper for wrinkles or folds. Never use paper that is folded, wrinkled, or torn in any way. It may cause paper jams.
- Make sure the pinchwheels are spaced across the paper as outlined in the ***User Guide***.
- The pinchwheels should never be positioned over bearings on the drive shaft as paper tearing and bunching will occur. Verify that the pinchwheels are positioned over treads (e.g. under the white markers affixed to the traverse.)
- Check to make sure that the printer is level. *See the **Quick Start Guide** for more information*.
- The paper may slip when debris accumulates on the drive shaft. Inspect and clean the drive shaft. Refer to the *Routine Maintenance* chapter in the ***User Guide*** for more information.
- Contact an Ioline distributor or Ioline Customer Service if you are unable to resolve the problem or if the printer is damaged.

Print quality problems

Line quality

In most cases, poor line quality is caused by one of several things:

- The ink cartridge is empty, dirty, damaged or dried up.
- The Motion Factor or Carriage Calibration needs adjustment.
- The platen is not level

If line quality is uneven, try the following:

1. Press **Start/Stop** then the **Clean** keys on the keypad to automatically clean the cartridges.
2. Inspect the ink level window on cartridge. If it is black, then the cartridge is empty. Replace it with a new one.
3. Remove the cartridge(s) and manually clean the print head with a (deionized) water-moistened, lint-free cloth. (See ***Cartridge Maintenance and Handling*** in the ***User Guide***.)

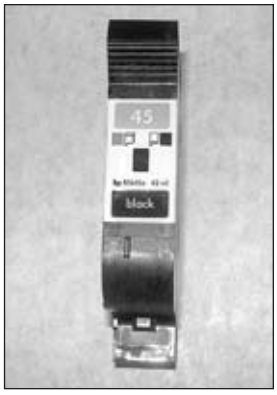

Figure 23. HP cartridges have an ink level indicator.

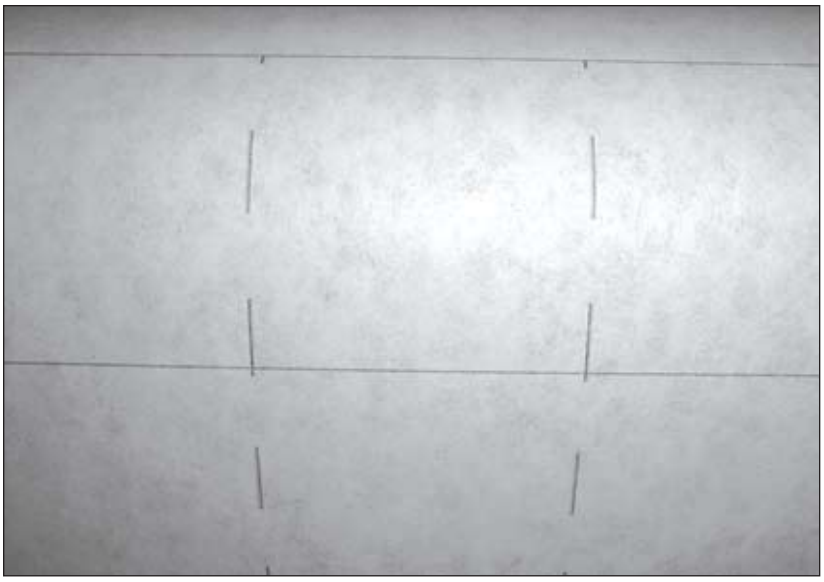

Figure 24. The ink cartridge is dirty, dry, or empty.

4. Plot on higher quality or undamaged (free of wrinkles and bubbles) paper.
5. Use genuine HP 45 cartridges as recommended by Ioline.
6. Recalibrate cartridges as described below.
7. Level the platen as outlined in the ***Quick Start Guide***.
8. Contact an Ioline distributor or Ioline Customer Service if you need further help.

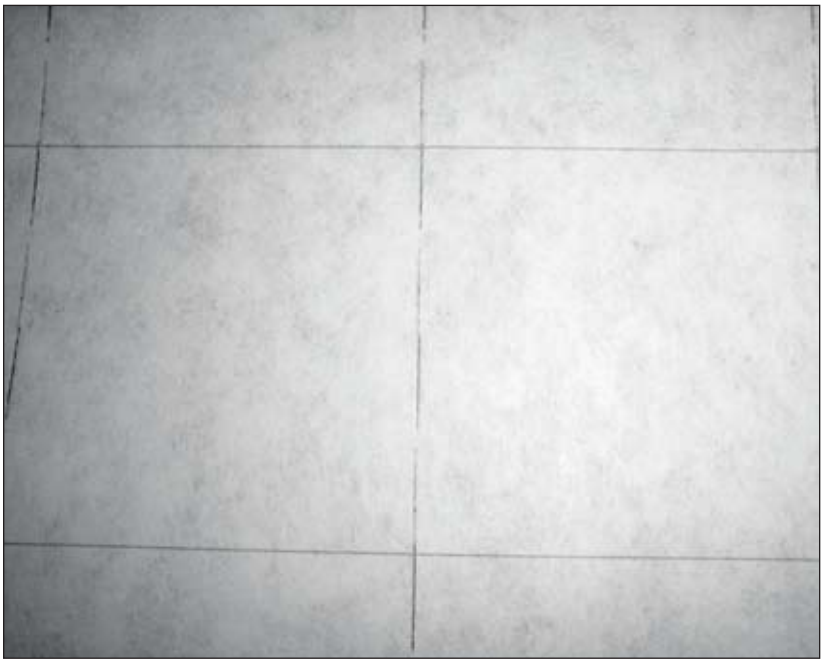

Figure 25. The ink cartridge requires cleaning.

Dirty or damaged cartridge

Sometimes a cartridge will go bad for no apparent reason. The cartridge may look perfect and be full of ink, but it will not plot. If this occurs first try pressing the Clean button on the keypad. Install a new cartridge and the tests to see if this fixes the problem.

If this has no effect remove, clean, inspect for damage, then test. If the cartridge fails again replace it.

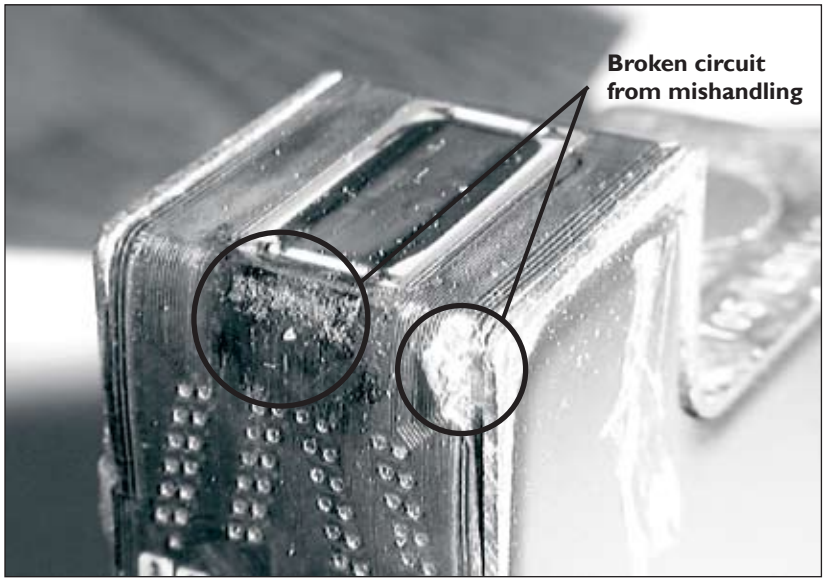

Figure 26. Damaged and dirty print cartridge.

Cartridge calibration

The **Cartridge Calibration** window is located in the **Control Center** and can be accessed in the **Tools** menu. Step-by-step instructions on the calibration process are provided in the ***User Guide***.

The examples below show different results and settings of the cartridge calibration window. If the printer is printing poorly, check some of the examples here for a possible fix.

Calibration overview

Cartridge Alignment:	Aligns the ink cartridges with each other. On 1-head machines, cartridge calibration is not neccessary.
Motion Adjustment:	Aligns (side to side) each pass of the carriage with the next pass.
Frame Gap:	Aligns (from top to bottom) each pass of the carriage.

Cartridge alignment

The Control Center includes cartridge alignment settings (**Figure 27**). These are used for other Ioline inkjet plotter models. Since the FJ Printer only has one print head, you do not need to perform ink cartridge alignment.

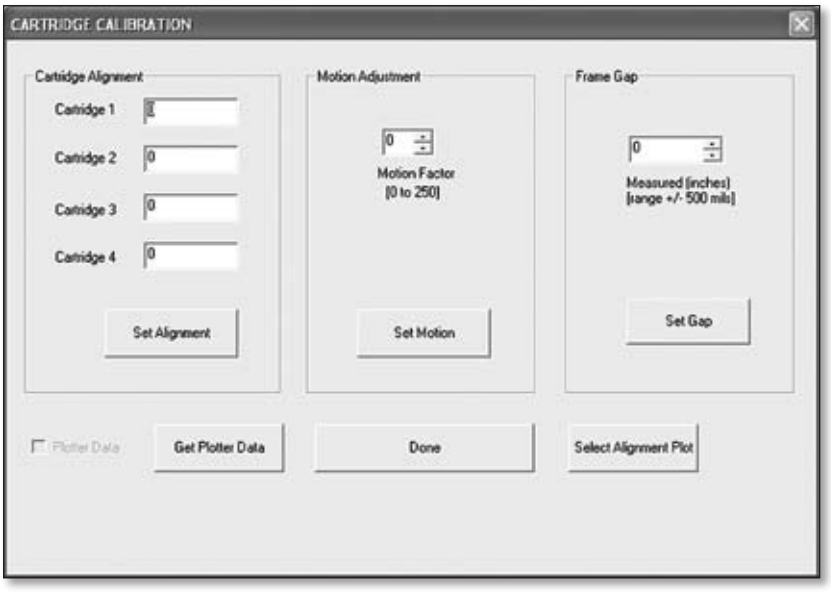

Figure 28. The **Cartridge Calibration** window in the **Control Center.**

Motion adjustment

To understand **Motion Adjustment**, think of each reversal in carriage direction as a "pass". With every pass, each head draws a line $^1/_2$-in long. If the FJ Printer has 2 heads, it draws a 1-in line for each pass. A four-head machine will draw a 2-in line.

If the **Motion Factor** is too low, the printer will draw the line too late. Visually, this appears as if the line drifts to the right, as shown in **Figure 29**. **Motion Factor** set too high results in drift to the left.

Motion Adjustment is done when each carriage pass doesn't line up with the previous one. Lines will "Stair-Step" back and forth and not look right. When the carriage is in motion the 'Motion Adjustment' will tell the ink cartridge to print sooner or later depending on the number in the 'Motion Adjustment field' in the FJ8 Control Center.

Figure 28. The Motion Adjust window.

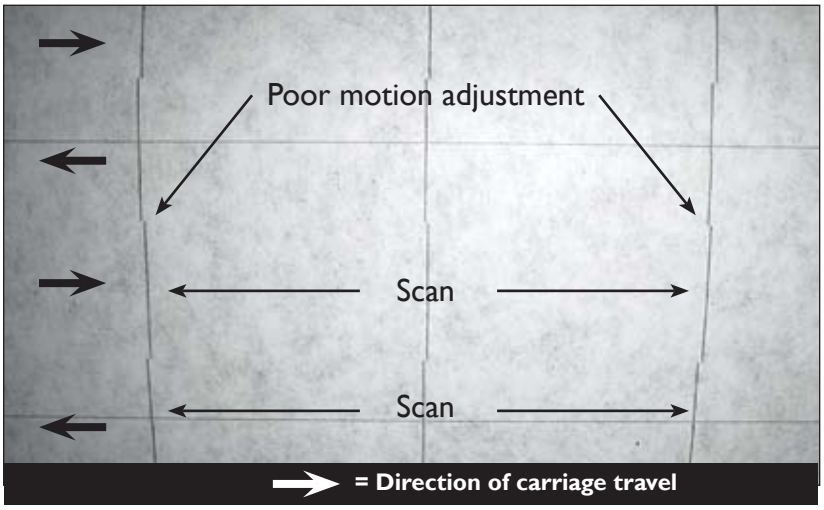

Figure 29. The heads are drawing the lines too late on this plot.

1. Make sure the plotter is connected to the computer. Press **Set Origin** to illuminate the green **OK** LED on the keypad.
2. Open **Control Center**.
3. Select '**Tools/Cartridge Calibration**' on the toolbar.
4. The **Cartridge, Motion and Gap Adjustment Window** will open.
5. In the field for **Motion Adjustment**, type in the number **40** to start.

6. Click the **Set Motion** button.
7. Click the **Close** button.
8. Click the File menu then **Send File…**
9. In the folder **C:\ioline\calibration**, double-click on the file **Calibration Grid.plt**.
10. The machine will start plotting the file.
11. Look at the lines as the carriage goes back and forth. If they line up, skip to **Step 14**.
12. Wait for the plot to finish and follow **Steps 3** and **4** again.
13. In the **Motion Adjustment** field try a different number. See the **Motion Adjustment** chart below for help with the numbers for this field.
14. Once the lines match you are done. Close the **Control Center** and plot normally.

Frame Gap Adjustment

Frame Gap indicates a gap or overlap between each carriage pass. If the lines are not solid (e.g. appear dashed or dotted), you will need to adjust the gap distance in the **Control Center**:

1. Make sure the plotter is connected to the computer. Press **Set Origin** to illuminate the green **OK** LED on the keypad.
2. Open **Control Center**.
3. Select '**Tools/Cartridge Calibration**' on the toolbar.
4. The **Cartridge, Motion and Gap Adjustment Window** will open.
5. In the field marked **Frame Gap**, type the number **2** to start.
6. Click **Set Gap** button.
7. Click the **Close** button.
8. Click the File menu then **Send File…**
9. In the folder **C:\ioline\calibration**, double-click on the file labeled **Calibration Grid FlexJet.plt**.
10. The machine will start plotting the file.
11. Look at the lines as the carriage goes back and forth. If they line up, skip to **Step 14**.
12. Wait for the plot to finish and follow **Steps 3** and **4** again.

Figure 30. The Frame Gap window.

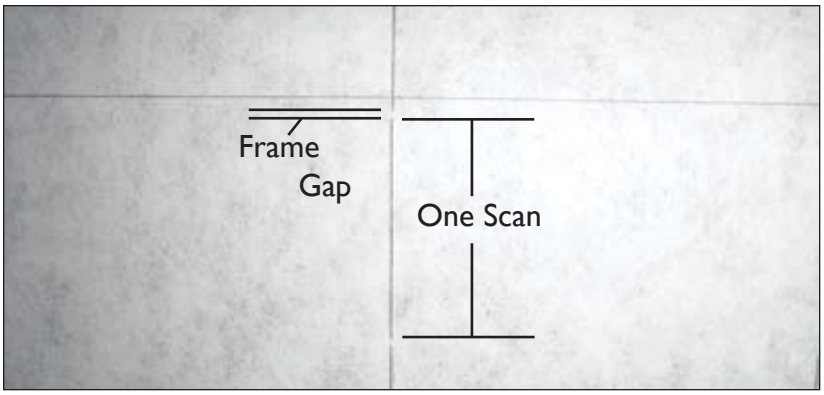

Figure 31. Frame gaps on the plot.

13. In the **Frame Gap** field try a different number. See the **Frame Gap Adjustment** chart below for help with the numbers for this field.
14. Once the lines match you are done. Close the **Control Center** and plot normally.

Figure 32. Occasional frame gaps may indicate that the FJ Printer platen or stand is not level.

Unexplained frame gaps

If your plots exhibit occasional frame gaps, like **Figure 32** for instance, may indicate that the printer body is not level. Notice how the right and left lines are right on, but the middle line mis-aligned.

Try releveling the printer to see if this corrects the problem. The ***Quick Start Guide*** provides detailed instructions. You'll need to locate the height-adjusting spacer in the **Accessory Kit** for this task (see **Figure 33**).

If the leveling procedure does not correct the problem, *see* ***Ink cartridge stall problems*** *later in this chapter*.

Figure 33. The height-adjusting spacer.

Frame Size Adjustment

Panel size is based on older pen plotters and the software that runs them. Pen plotters plot on a fixed panel before pulling more paper through the machine to plot on the next panel. Although the printer runs continuously, panel size still applies.

Most software, like PAD® and Optitex®, have a **Panel or Frame Size** setting. Both the software and the plotter must match for the plot to look right. If a gap forms in the plot, then the panels should be adjusted.

1. Make sure the plotter is connected to the computer. Press **Set Origin** to illuminate the green **OK** LED on the keypad.
2. Open **Control Center**.
3. In the upper right corner of the **Control Center** window, you will see **X-** and **Y-axis** panel size fields.
4. For most software to work properly, the **X-axis** panel needs to be set to 35 inches. (The default is 21,600 inches).
5. Type **35** in the **X-axis** panel field
6. In the **Y-axis** field, type the width of your paper in inches. (The default is 72 inches.)
7. Once you are done click the **Set Size** button
8. Close the **Control Center**.
9. Open the software you use to design your plot files (PAD®, Optitex®, etc.)
10. Change the **X-** and **Y-axis** panel sizes to match the values in the **Control Center**.
11. If you are unsure of how to do this, contact your software vendor for help.

Note

If you use Flex Plot software to send the plot to the plotter, you can skip the **Panel Size Adjustment** procedure.

Ink cartridge stall problems

Always remember to close and lock the cartridge doors after removing or replacing an ink cartridge. Failure to do so can damage the print electronics. Ink cartridge stalls can also crack from mishandling, causing print misalignment that is difficult to calibrate.

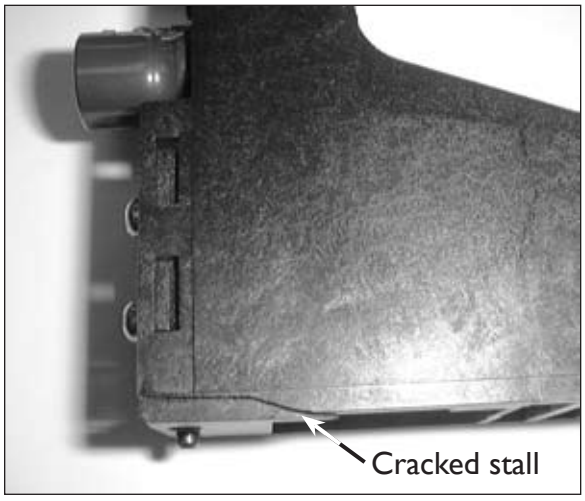

Figure 34. The ink stall can crack if the cartridge door is not closed and locked.

Noisy carriage movement

If you notice unusual noise coming from the carriage, the wheel on the carriage assembly may need cleaning or replacement. Remove the carriage assembly from the traverse and clean the wheel. Also wipe the traverse rails before re-installing the carriage assembly. If cleaning does not resolve the noise, contact Ioline Customer Service.

Figure 35. If the carriage makes noise, you may need to clean or replace the wheel.

Mechanical, electrical, and electronic diagnostics

Electrical problems

If, during power on, the printer experiences one or all of the following, it may have a blown transistor:

- Smoke coming from inside the machine.
- The carriage won't move.
- The carriage hits the right or left side hard.
- The carriage moves in only one direction.
- Motors only move in one direction
- A motor on the machine will try to keep turning after it stops.

The most common reason for a transistor to fail is a bad or old motor. As motors age, their bearings start to break down due to insufficient lubrication. As this break-down happens the transistors have to work harder to move the motor, causing them to heat up and eventually fail. (**Figure 36**).

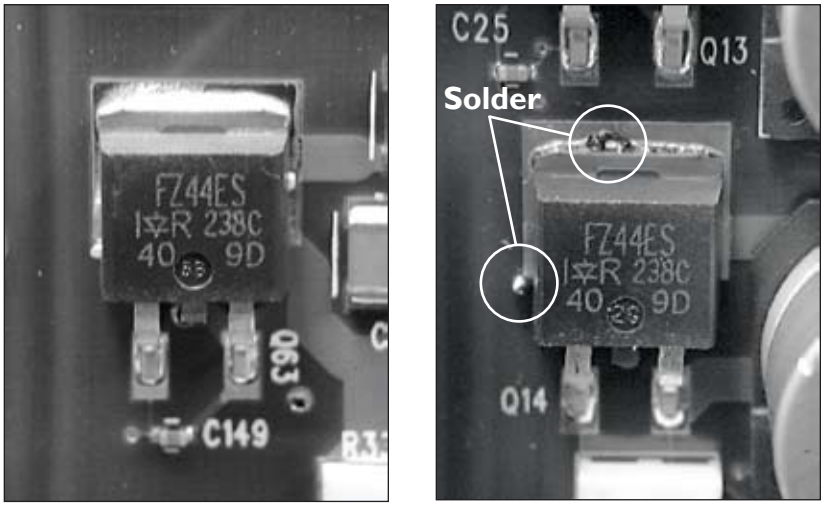

Figure 36. A good transitor on the left; the one on the right has failed. The presence of solder bubbling out of the chip indicates it overheated.

In most cases, both the transistor and motor will need replacement. Contact Ioline Tech Support for more detailed instructions on testing a transistor.

Troubleshooting sensors

The printer uses the same sensor in multiple places for tracking paper path status. The sensors are industrial-grade and will withstand many years of use. If a sensor ever fails, the following conditions might occur:

1. The paper take up motor will not stop rotating and will pull the paper tight against the platen. This might result in an X motor jam and a 'popping' noise during printing.
2. The **Paper Out** sensors will not detect that the paper feed roll is empty and printing may continue with no paper in the printer.

To replace a defective sensor:

> **IMPORTANT: Never disconnect or connect sensors to the machine or electronics when power is on. This will permanently damage the sensor and might affect the logic board.**

1. Power off the printer.
2. Disconnect the plug from the sensor.
3. Note the orientation of the old sensor, specifically where the optical 'eye' is pointing.
4. Remove the old sensor by removing the hardware or adhesive.
5. Mount the new sensor in exactly the same orientation as the old one.
6. Connect the plug to the sensor, it is keyed to only connect one-way.
7. Power on and test the installation.

General mechanical / electrical issues

If you encounter any of the following problems, try the diagnostics test outlined below:

- The printer didn't initialize (No LEDs, fans not running, carriage didn't move, small jerking motion during power up)
- The printer works, but did not initialize after being reset (e.g. after printer was turned off, then back on).
- Jam messages occur without media or other objects obstructing normal operation.
- The carriage is making loud or unusual sounds.

Required tools

- Multimeter capable of reading AC voltage
- Phillips head screwdriver
- Allen wrenches: 1/16 and 5/64
- Nut driver or socket wrench with extension: 11/32

Simple electrical diagnostics test:

1. Turn the power to the machine off.
2. Inspect the printer for any obvious damage or signs of mechanical malfunction.
3. Measure the voltage at the wall socket. Verify that the AC voltage is between 85 and 250 VAC.
4. Clear all paper from the machine and make sure that nothing is obstructing movement of the front take-up roll.
5. Move the carriage from side to side by hand. If the carriage resists easy movement, the motor may be bad or there could be a short on the main board. (*See **Motor Problems** and **Testing the Logic Board** later in this chapter*.)

Motor problems

The following are possible motor problems:

1. Bad or burned motor components.
2. The motor brushes are worn down.
3. A transistor has blown on the logic board.
4. The motor is unplugged.
5. The encoder is dirty, damaged or unreadable.

Testing the servo (Y-axis) motor

Perform the following simple test to determine if a motor problem exists.

1. Turn machine off and unplug the power and data cables.
2. Follow the procedure for removing the right cover.
3. Locate the **Y-axis motor** behind the keypad of the plotter.

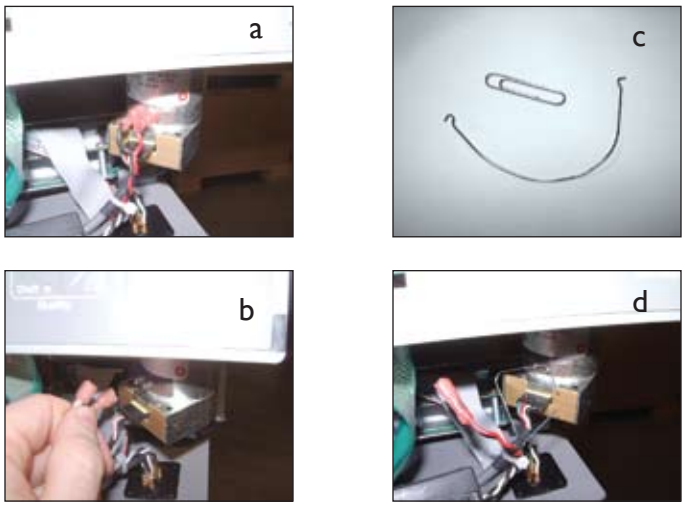

Figure 37. Testing the Y-Axis motor.

Note

This test applies to all the motors on the FJ Printer.

CAUTION

Ensure that the FJ Printer is unplugged from the wall outlet and that all AC power cables are removed from the printer before replacing the cable.

The discharge of static electricity may damage the carriage and logic board components. Use the included ground strap throughout the procedure. Attach one end of the ground strap (included in the **Upgrade Kit**) to your wrist and the other end to a bare metal portion of the printer (like the frame the holds the service station.) Keep plastic objects away from the carriage and logic board assemblies. Remove the wrist strap only after the new carriage is attached to the traverse, the cover is installed, and the metal cover is secured over the main logic board.

Note

If you find a bad motor, contact Ioline Tech Support. It's possible that a transistor on the main logic board (PCB) is blown.

4. Unplug the yellow and black wires from the motor.
5. Using a piece of metal (like a paperclip) touch the two connector lugs on the motor. (Putting the paperclip through the holes in the lugs works well.)
6. Move the carriage back and forth slowly by hand.
7. While moving the carriage back and forth, remove the paperclip from the lugs on the motor.
8. You should notice a huge difference in resistance when touching the lugs together and not. If this is the case, the servo motor is good and does not need replacing.
9. If you notice NO difference when touching the two lugs together and and not, the motor is most likely bad and needs to be replaced.

Testing the X-axis servo motor

1. Follow the procedure for removing the bottom cover.
2. Locate the X axis motor behind the main PCB inside the plotter body.
3. Unplug the red and black wires from the motor.
4. Using a piece of metal (like a paperclip) touch the two connector lugs on the motor. (Putting the paperclip through the holes in the lugs works well.)
5. Rotate the main drive shaft by hand.
6. While rotating the shaft, remove the paperclip from the lugs on the motor.
7. You should notice a huge difference in resistance when touching the terminal lugs together and not. If this is the case, the servo motor is good and does not need replacing.
9. If you notice NO difference when touching the two terminal lugs together, the motor is most likely bad and needs to be replaced.

Logic board assembly troubleshooting

The electronic logic board is constructed of many advanced electronic components with fine pitch connections. Very few of the components are user serviceable.

The table below explains indicator lights and test points on the logic board and some troubleshooting steps to resolve user serviceable issues.

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Logic board troubleshooting steps (Revision 2)

LED/Test Point ID	Normal	Indicates	Error
TP8	30 VDC	30 volt main power supply is functioning	Erratic machine performance.
TP9	3.3 VDC	3.3 volt regulated power supply is functioning	Erratic machine performance.
TP10	5 VDC	5 volt regulated power supply is functioning	Erratic machine performance.
D13	Dark light	Y motor fault	Solid red
D14	Dark light	X motor fault	Solid red
D15	Dark light	Take up motor fault	Solid red
D17	Dark light	Carriage power fault	Solid red
D9-D12	Blinking red pattern	Motor control system functioning	Solid lights or no lights

Causes	Troubleshooting Steps
A short on the PCB. Main power supply voltage is not adjusted properly. Main power supply has failed.	DC voltage measurement between TP11 (ground) and TP8 should read 30 volts +/- 1%. If voltage is out of specification, check power supply connections and main power supply output. Contact Ioline Customer Service for more information if the voltages are out of specification.
On-board regulator failed. Main power supply failed.	DC voltage measurement between TP11 (ground) and TP8 should read 3.3 volts +/- 5%. Return logic board to Ioline for service.
On-board regulator failed. Main power supply failed.	DC voltage measurement between TP11 (ground) and TP10 should read 5 volts +/- 5%. Return logic board to Ioline for service.
Over-current condition on circuit due to a short or high heat.	Check the motor connections and motor to ensure there are no shorts to ground. A hardware problem with the motor drive circuit. Return the board to Ioline for service.
Over-current condition on circuit due to a short or high heat.	Check the motor connections and motor to ensure there are no shorts. A hardware problem has occurred with the motor drive circuit. Return the board to Ioline for service.
Over-current condition on circuit due to a short or high heat.	Check the motor connections and motor to ensure there are no shorts. A hardware problem has occurred with the motor drive circuit. Return the board to Ioline for service.
Over-current condition on circuit due to a short or high heat.	Check the carriage cables and the carriage logic board to ensure there are no shorts to ground. A hardware problem has occurred with the power switch for the carriage printhead power. Return the board to Ioline for service.
Motor jam. Software error.	Remove issue causing motor jam. Cycle power on machine. Update to latest firmware.

Service & support

Ioline has many years of experience working with designers, graders and marker makers. Feel free to contact us if you have questions—or to share information.

Getting help

Ioline is committed to providing the highest quality service and support to its customers. If you need assistance with an Ioline printer, a number of resources are available:

1. First, refer to this ***User Guide*** and ***Quick Start Guide*** for answers to your specific questions.
2. Many detailed troubleshooting and repair issues are listed in the ***Service Manual***, available upon request from Ioline Customer Service.
3. Consult the support section of the Ioline Web site: **www.ioline.com**. FJ Printer users must have a **User Name** and **Password** to log into the site. Please contact Ioline customer service to set up your free account.
4. For additional assistance, contact your local dealer or Ioline Customer Service. Contact information is listed under ***Customer Service*** in this chapter.

Any warranty servicing of this product not specifically described in this manual must be authorized in writing by Ioline Customer Service. You may obtain service by calling or faxing Ioline Customer Service. The technicians will help you determine the nature of the problem. If factory repair is necessary, you will receive a RMA (Return Material Authorization). Please gather the information indicated on the next page before contacting Ioline or your dealer.

1. When returning a machine, carefully package the equipment in its original container or packaging equivalent. You may purchase shipping containers from Ioline by contacting Ioline Customer Service. **Ioline is not responsible for any damage due to inadequate or improper packaging.**
2. Carefully wrap and secure all items in the shipping container to prevent damage. Seal the container and note the RMA number near the address block.
3. Ship the container using FED-EX or another approved carrier. COD shipments **ARE NOT ACCEPTED**. An Ioline representative will contact you prior to the start of work with an estimate of repair cost. All repairs are warranted for 90 days.

Customer service

Ioline Corporation is committed to providing quality service and support to our customers. If you need assistance with an Ioline product, contact your local dealer or Ioline authorized service center. You may also contact:

Ioline Customer Service Department
Monday through Friday
7:00 A.M. - 5:00 P.M. U.S. Pacific Time
Voice: 1.425.398.8282
Fax: 1.425.398.8383
support@ioline.com
www.ioline.com

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CHAPTER 4

Repair Procedures

Maintenance procedures

See the ***User Guide*** for information on maintaining the printer and storing inkjet cartridges.

Repair procedures

The diagnostic processes that follow are detailed and invasive. Do not attempt to service the printer until it you determine that simpler solutions fail to resolve the problem (*see* ***Troubleshooting***).

Follow the recommended sequence in **Figure 38** when troubleshooting repair issues with the printer and record the results of your diagnostic examination on the **Diagnostic Record** (*see below*).

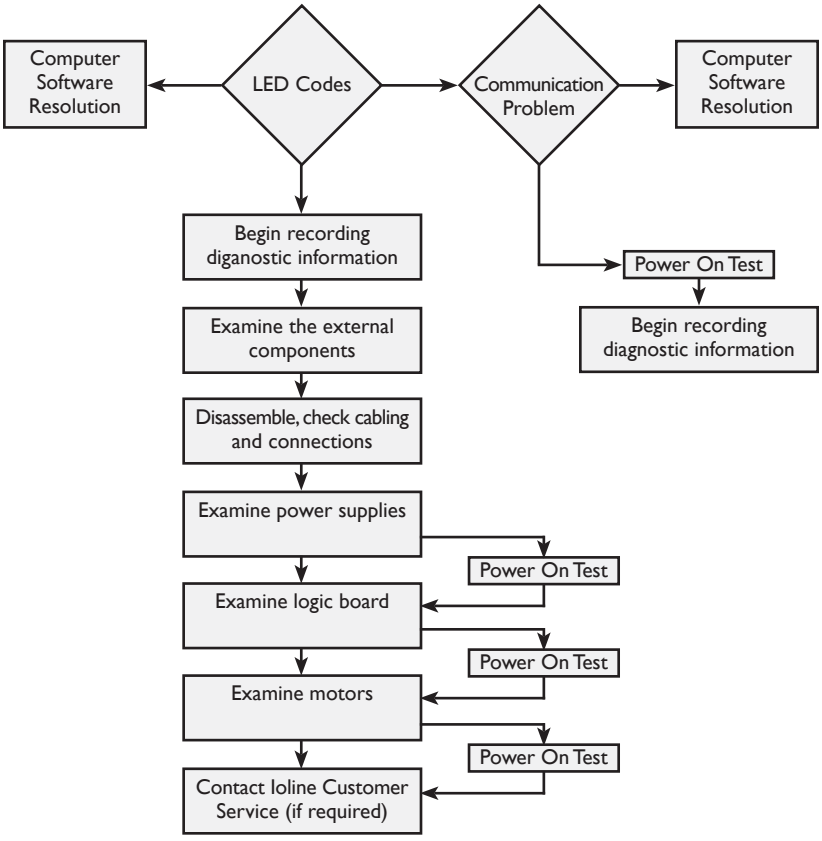

Figure 38. Mechanical, electrical and electronic diagnostics flow chart.

Requesting service

If the suggestions and guidelines in this manual don't fix the problem, fill out the form below and contact Ioline Customer Service.

Diagnostic Record

- What is the serial number for this unit? _____
- What is the logic board revision #? _____
- Name of dealer who sold the machine to you? _____
- Any lights on the logic board associated with this problem? **Y / N**
- Any lights on the keypad associated with this problem? **Y / N**
- Has the unit worked properly up to the point of this recent failure? **Y / N**
  If yes, please describe them: _____
- Any communications or software problems? **Y / N**
  If yes, please describe them: _____
- When the printer is first turned on—
  - Does the carriage move smoothly? **Y / N**
  - Does the fan come on? **Y / N**
- With power off, slide the carriage from side to side.
  - Does the carriage slide easily to each side? **Y / N**
  - Is there more resistance to move the carriage: **Left / Right / Equal**
- Were all cable connections securely fastened to the logic board? **Y / N**
- Was the power voltage within the tolerance? **Y / N**
- Record the power supply voltage readings here:
  TP8 (+30V) _____
  TP9 (+3.3V) _____
  TP10 (+5.0V) _____
- Were any encoders bad? If yes, which ones? **Y / N**
  X-motor____ **Y motor**____ **Roll Feed motor**____
- Please list any other problems. (Be specific about the nature of the problem and the symptoms associated with it.

  _____

  _____

  _____

  _____

  _____

Cover removal procedures

Left Cover Removal

1. Power off and unplug the data and power cables.
2. Remove the two black Phillips screws (Figure 39, photos 1 & 2).
3. Remove the left cover (**Figure 39**, photo 3).

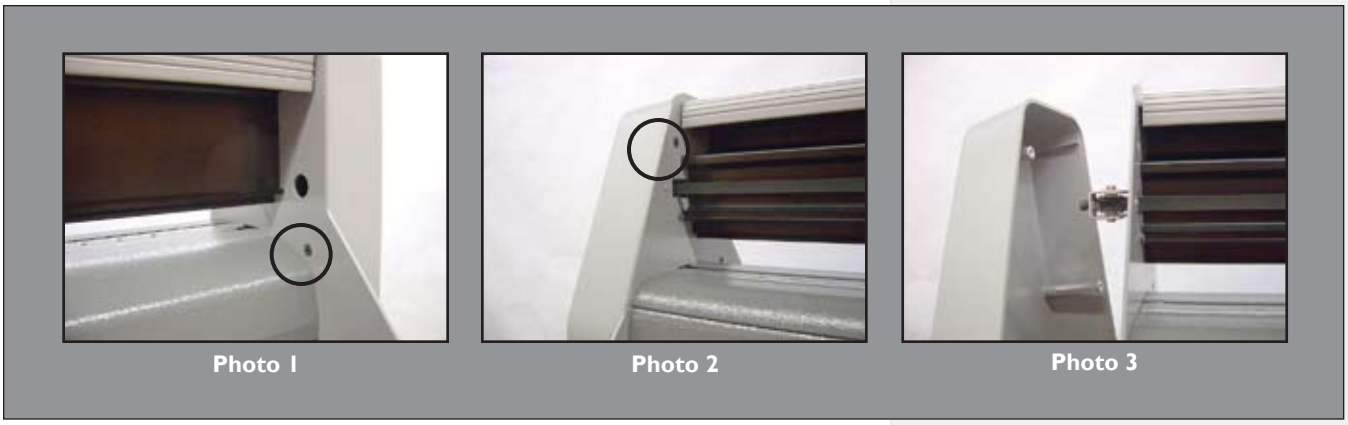

Figure 39. Left cover removal.

Right Cover Removal

1. Power off and unplug the data and power cables.
2. Remove the two black Phillips screws (**Figure 40**, photos 1 & 2).
3. Carefully pull the cover to the right to remove (**Figure 40**, photo 3).

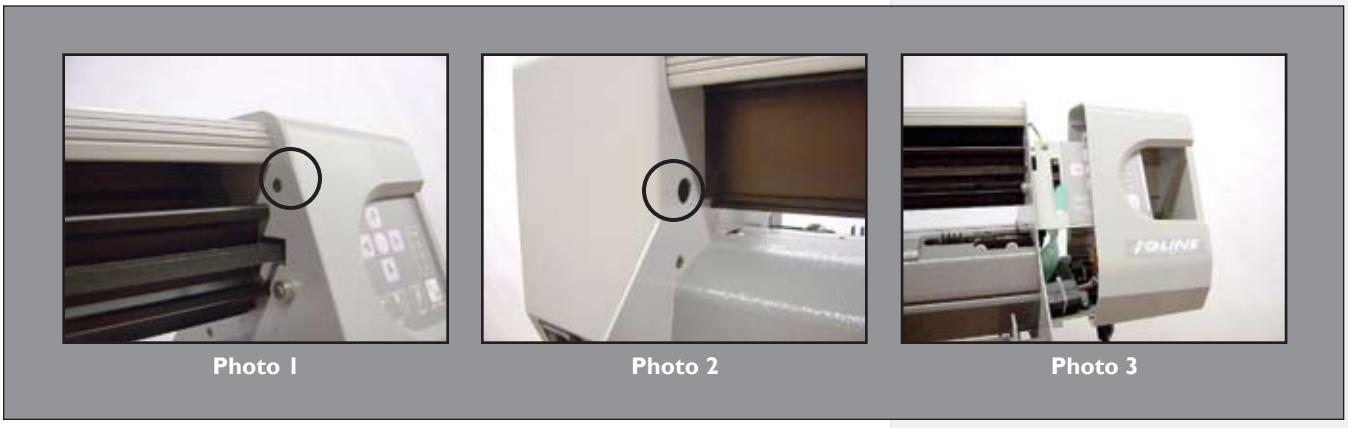

Figure 40. Right cover removal.

Left Bottom Cover Removal

1. Power off and unplug the data and power cables.
2. Unplug the take-up motor cable from the bottom right side of the machine (**Figure 41**, photos 1 & 2).
3. Remove the right and left screws on the rear of the machine (**Figure 41**, photos 3 & 4). These hold the printer on the stand (do not remove the front screws (**Figure 41**, photos 5 & 6).
4. Make sure the stop screws are installed on the take-up plate on both sides of the machine (**Figure 41**, photos 5 & 6).

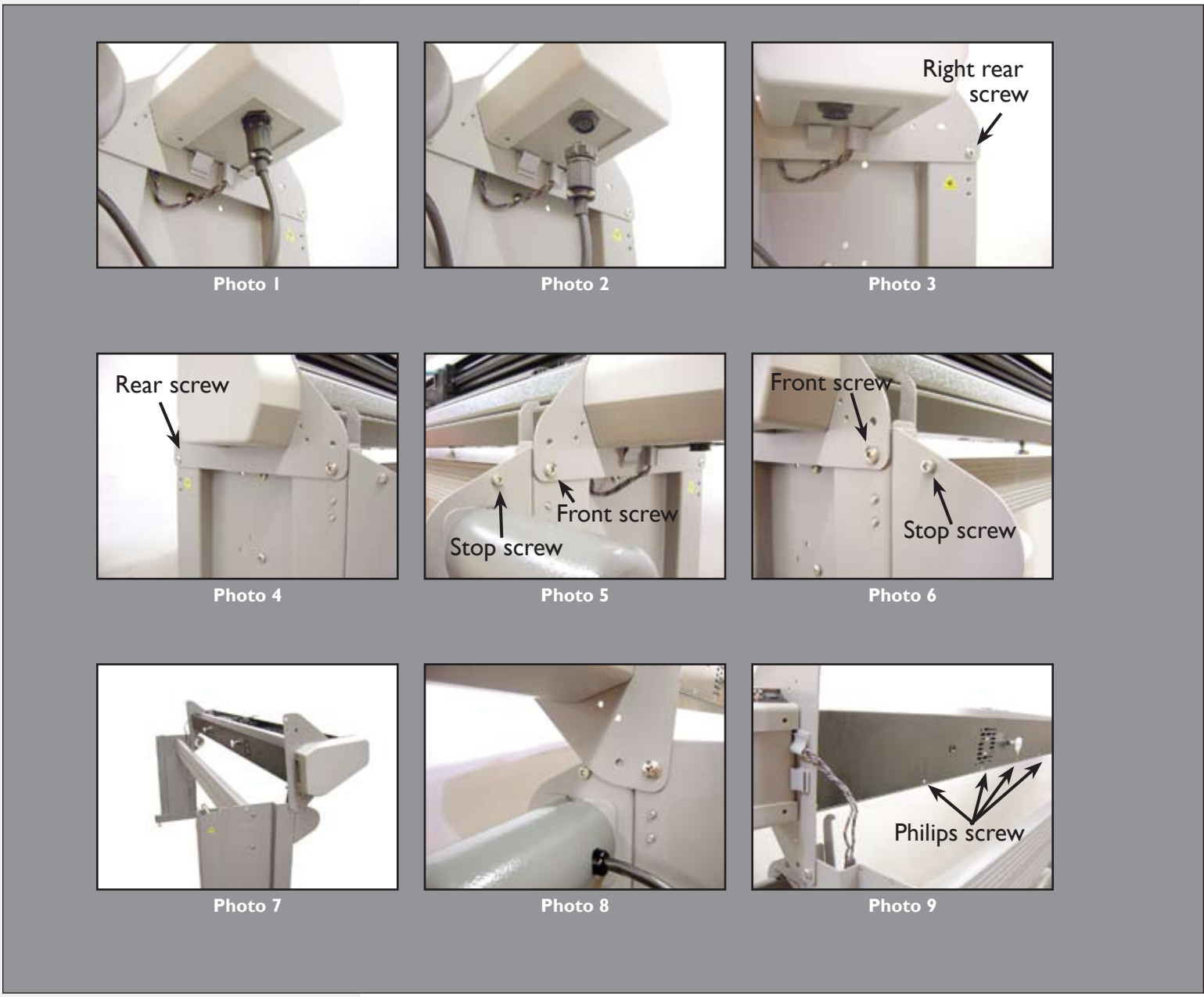

Figure 41. Bottom cover removal steps.

5. Carefully rotate the machine forward until the head stops (**Figure 41**, photos 7 & 8).
6. Remove the Phillips screws from the left bottom cover (**Figure 41**, photos 9 & 10).
7. Carefully unplug the fan and sensor cables (**Figure 41**, photos 11, 12 & 13).
8. Remove the cover (**Figure 41**, photo 14).

Photo 10

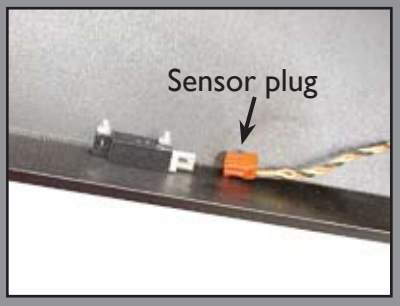

Photo 12

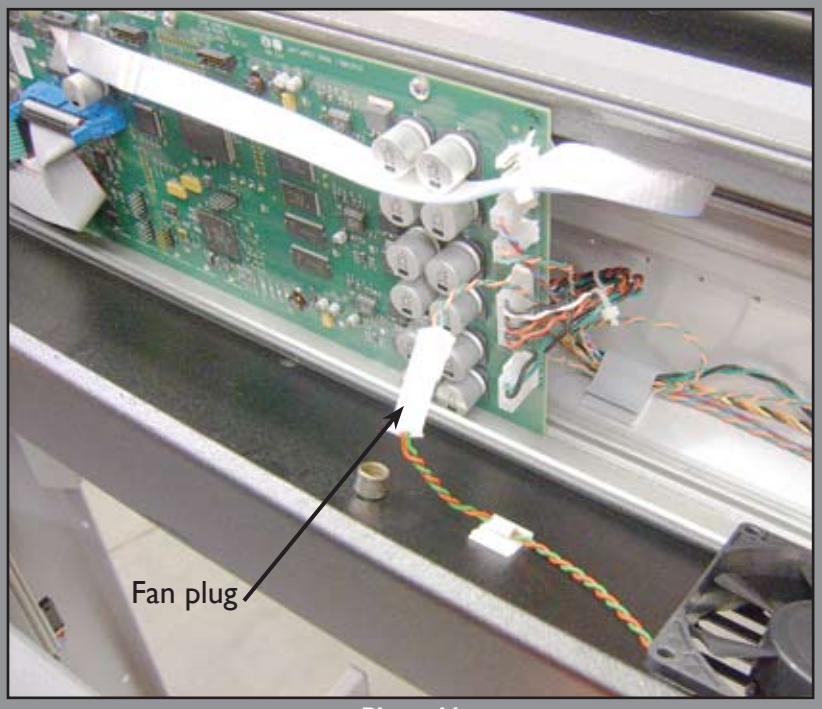

Photo 11

Photo 13

Photo 14

CAUTION

Ensure that the FJ Printer is unplugged from the wall outlet and that all AC power cables are removed from the printer before replacing the cable.

The discharge of static electricity may damage the carriage and logic board components. Use the included ground strap throughout the procedure. Attach one end of the ground strap (included in the **Upgrade Kit**) to your wrist and the other end to a bare metal portion of the printer (like the frame the holds the service station.) Keep plastic objects away from the carriage and logic board assemblies. Remove the wrist strap only after the new carriage is attached to the traverse, the cover is installed, and the metal cover is secured over the main logic board.

CAUTION

Do not hold the carriage by the inkjet head stalls. Improper removal or installation of the carriage can damage the carriage wheels.

Note

Make sure the belt is not twisted before attaching the clips.

Carriage Procedures

Carriage replacement

Required tools

- Phillips screwdriver
- $^{9}/_{64}$-in (3.5mm) Allen wrench
- $^{5}/_{16}$-in (8mm) open-end wrench
- Small, flat-tipped screwdriver

Parts/tools included with the upgrade kit:

- Replacement carriage assembly
- Tyraps (8)
- Grounding wrist strap

1. Follow procedure for left cover removal earlier in this chapter.
2. Mark the Y-belt tensioner screw and bracket with Whiteout® so that it is easy to properly tighten the screw after re-installation. Loosen the Y-belt tensioner (**Figure 42**, photo 1).
3. Unclip Y-belt from carriage (**Figure 42**, photo 2).
4. Remove the carriage cover by removing both cover screws (**Figure 42**, photos 3 & 4).
5. Loosen the carriage locking nut until the thick washer drops (**Figure 42**, photos 5 & 6). Don't remove.
6. Push down on carriage and pull the bottom toward you. Remove from machine (**Figure 42**, photo 7).
7. Unplug ribbon cable from carriage (**Figure 42**, photos 8 & 9). Cut all tyraps holding cable on carriage.
8. Plug in new ribbon cable to new carriage. **Important: make sure the cable plugs are plugged in properly. If a row of pins are missed you can cause damage to the carriage or logic board** (**Figure 43**, photos 8 & 9). arrange as shown in **Figure 42**, Photo 8. Use new tyraps (included) to secure cable to top of carriage. Ensure the black sleeve is secured by 3 cable tyraps.
9. Put top wheel on traverse (**Figure 42**, photo 7).
10. Push down. Put bottom wheels on traverse.
11. Lift up on carriage locking nut washer and tighten the nut. (**Figure 42**, photos 5 & 6).
12. Clip Y-belt clips to carriage. (**Figure 42**, photo 2).
13. Tighten tensioner (**Figure 42** photo 1) using the mark made above.
14. Test.
15. Re-install left carriage cover and left cover.

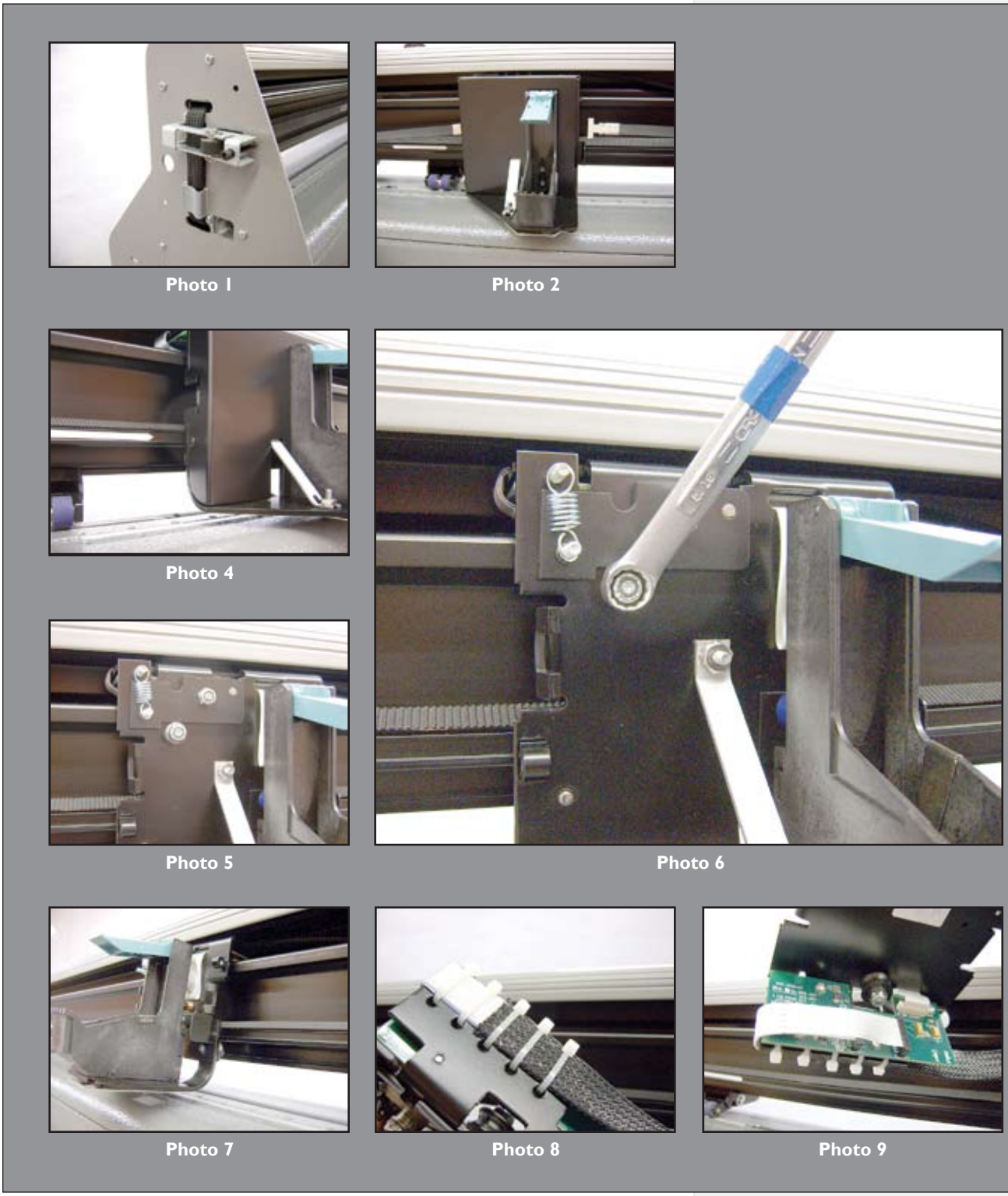

Figure 42. Carriage replacement (FJ Printer carriage shown).

Carriage Wheel Replacement

1. Follow carriage replacement procedure (**Steps 1**, **2**, **3**, **4**, **5** & **6** only).
2. Locate the wheels (**Figure 43**, photo 1) and unscrew the wheel stud nuts on back of carriage (**Figure 43**, photo 2).
3. Remove the wheels (**Figure 43**, photo 3).
4. Install new wheels on the studs (**Figure 43**, photo 3).
5. Install the wheel stud nuts—not too tight, the wheels should move freely (**Figure 43**, photo 1).
6. Install the carriage by following the carriage replacement procedure (**Steps 9–15**) listed earlier in this chapter.
7. Move the carriage back and forth by hand to test.
8. If it works properly, re-install the left side cover.
9. If problems arise, contact Ioline Tech Support.

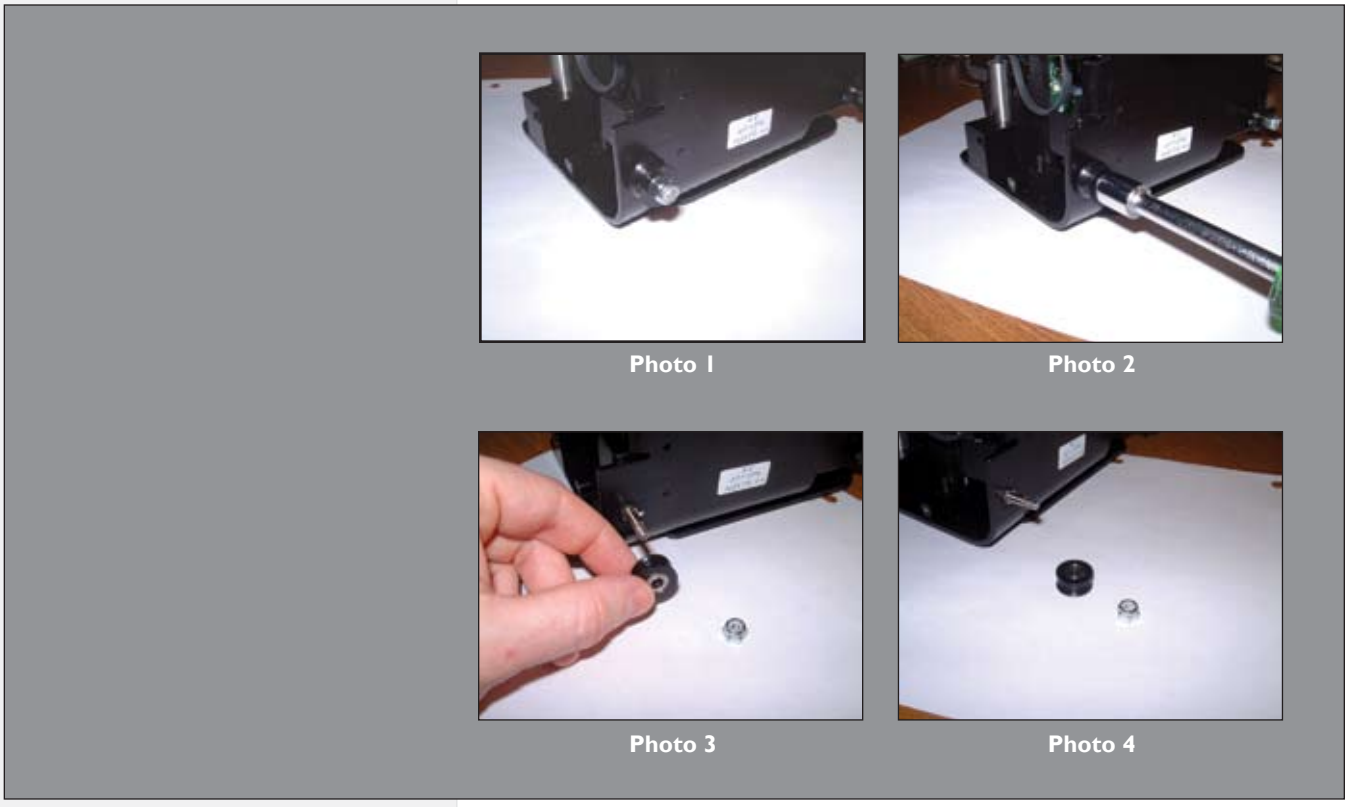

Figure 43. Carriage wheel replacement.

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Flex Cable Replacement

Required tools	
■ Phillips screwdriver	■ $^{5}/_{16}$-in (8mm) open-end wrench
■ $^{9}/_{64}$-in (3.5mm) Allen wrench	■ Small, flat-tipped screwdriver

1. Follow the procedures for left cover removal and carriage removal (**Steps 1–7**) earlier in this chapter.
2. Remove the ribbon cable cover (held on with double-stick tape) (**Figure 44**, photos 1 & 2).
3. Pull the ribbon cable through the left side of the machine (**Figure 44**, photos 3 & 4).
4. Follow the procedure for bottom cover removal earlier in this chapter.
5. Cut the tyraps holding the ribbon cable to the main logic board and other cables (**Figure 44**, photo 5). Remove cable from cable cups under platen.
6. Unplug the old ribbon cable from main logic (PCB) board (**Figure 44**, photo 6).
7. Remove from machine.
8. Put new cable through left end plate. Make sure the end with the black, thick ferrites is on the logic board end of the cable. Fold the cable connectors (as shown in **Figure 44**, Photo 6) before plugging in.
9. Plug the new ribbon cable into the PCB. (**Important: Make sure the cable plugs are plugged in properly. If a row of pins are missed you can cause damage to the carriage or logic board**) (**Figure 44**, photo 6).
10. Install left end and bottom covers.
11. Rotate the machine back to upright position. Make sure to install screws that hold machine on the stand.
12. Route the new cable into the opening on left end plate (**Figure 44**, photo 4).
13. Connect the new ribbon cable to the carriage. (**Important: Make sure the cable plugs are plugged in properly. If a row of pins are missed you can cause damage to the carriage or logic board**) (**Figure 44**, photos 7 & 8).
14. Install the carriage. (Follow the carriage replacement procedure, **Steps 9–15**).
15. Slide the carriage to the right side of the machine to check the ribbon cable loop (**Figure 44**, photo 9). **Caution: The loop of the ribbon cable must not hit the right end plate when the carriage is pushed all the way to the right end plate**.

16. Install the ribbon cable cover on the left side of the machine (**Figure 44**, photos 1 & 2).
17. Test.

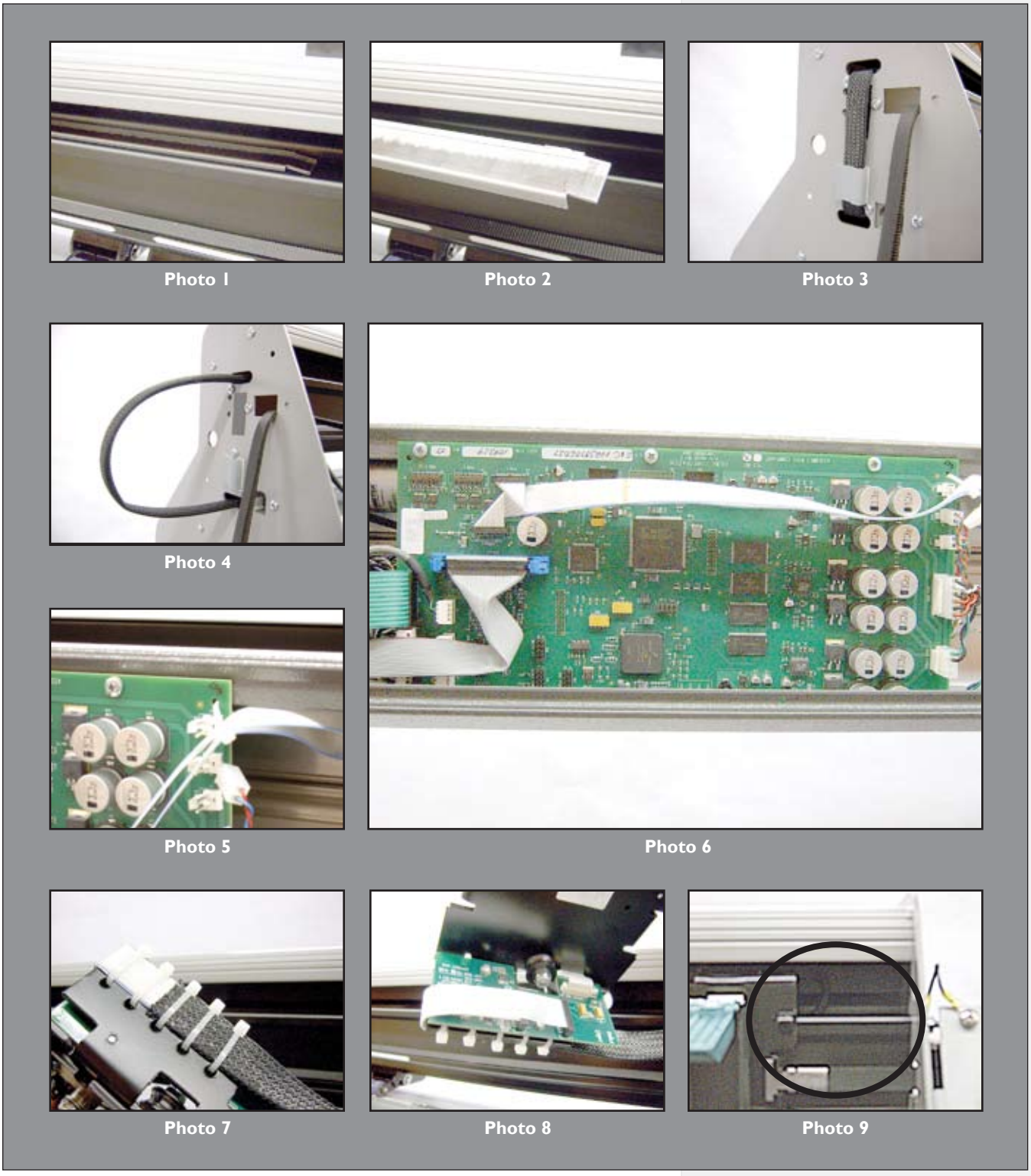

Figure 44. Flex cable replacement.

Logic Board Procedures

Logic board replacement

Tools Required:

- Phillips head screwdriver
- Tyrap (1)

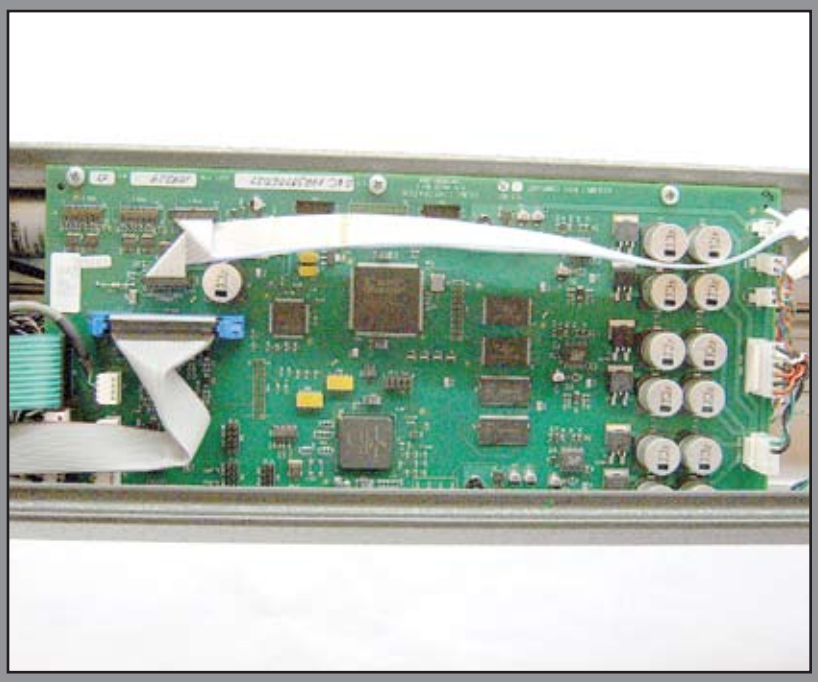

Photo 1

Photo 2

Photo 3

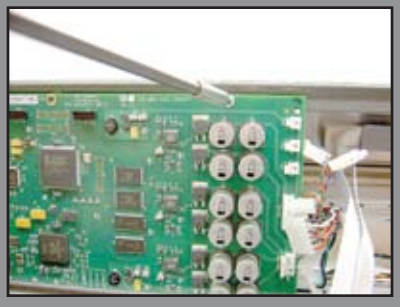

Photo 4

Photo 5

Photo 6

Figure 45. Main logic board replacement.

Note: Follow anti-static procedures

1. Follow procedure for bottom cover removal earlier in this chapter.
2. Unplug all connectors from Main logic (PCB) board (**Figure 45**, photos 1 & 2).
3. Cut the tyrap holding the ribbon cables (**Figure 45**, photo 3).
4. Remove the three Phillips screws holding the main logic board (**Figure 45**, photo 4).
5. Carefully remove the logic board from the machine (**Figure 45**, photo 5).
6. Install the new PCB. Make sure you place the logic board behind the rib in the body as shown. (**Figure 45**, photos 6 & 4).
7. Loop a tyrap through the hole in the upper right corner of the main logic board. Wrap it around the ribbon cable. Do not tighten yet. (**Figure 45**, photo 3).
8. Connect all wires to new main logic board. (Use caution and plug the connectors in properly, a missed row of pins will damage the board.) (**Figure 45**, photos 2 & 1).
9. Make sure the ribbon cables lay nicely and tighten the tyrap holding the ribbon cable but not so tight as to damage to the cable. (**Figure 45**, photos 3 & 1).
10. Install the bottom cover and the rotate machine back to normal operating position. Make sure to install screws that hold the machine on the stand legs.
11. Follow the procedure for Motion Adjustment in **Chapter 3**.
12. If problems arise, contact Ioline Tech Support.

CAUTION

When removing the new logic board from the packaging make sure you are wearing the static grounding strap correctly. and have attached it to a metal chassis ground. If there is a static discharge to the new board it may not function properly. The strap is included in the replacement kit.

Note

If firmware is a lower number than version 253.2, use the Manual firmware update procedure

CAUTION

Never disrupt the file upload to the machine. when installing firmware. Doing so will damage the main PCB and will make it difficult to re-install or update the firmware in the future.

Updating the firmware

1. Place the firmware installation file in the **C:\ioline** folder
2. Make sure the plotter is connected to the computer. Press the **Set Origin** on the keypad to illuminate the green **OK** LED.
3. Open the **Control Center**.
4. Click the **File** menu.
5. Click **Download Firmware**.
6. Locate the firmware installation file and double-click it. Never disrupt the file upload to the machine. when installing firmware. Doing so will damage the main PCB and will make it more difficult to re-install or update the firmware in the future.
7. The firmware will install on the machine. Wait for it to finish.
8. Close the Control Center. **Caution: Never disrupt the file upload to the machine. when installing firmware. Doing so will damage the main PCB and will make it difficult to re-install or update the firmware in the future.**
9. Turn the plotter power off.
10. While holding the button located directly above **Set Origin**, turn the plotter back on. (Keep pressing the button).
11. Once the carriage moves to the far left side of the machine, let go of the button.
12. Permit the machine to initialize normally.
13. When you see the red **OK** LED illuminate on the keypad, send a test plot to the printer.
14. Contact Ioline Tech Support if the plotter refuses to power up after installation.

Electrical Procedures

Tools Required

- Phillips head screwdriver

Power supply replacement

1. Follow procedure for bottom cover removal earlier in this chapter.
2. Unplug the small connectors from the power supply (**Figure 46**, photos 1 & 2).
3. Unscrew the two power supply screws. (**Figure 46**, photo 3).
4. Unplug the large connector from the power supply. (**Figure 46**, photos 4 & 5) and remove the power supply from the platen.

5. Plug the big connector into the new power supply (**Figure 46**, photos 5 & 4).
6. Install the new power supply into the plotter body. Make sure you insert the bottom tab into the gap built into the body of the machine (**Figure 46**, photo 3). Check the other power supply for an example.
7. Plug in the small connector (**Figure 46**, photos 2 & 1).
8. Route the wires, making certain they lay out of the way of the bottom cover screws (**Figure 46**, photo 6).
9. Install the bottom cover and the rotate machine back to normal operating position. Make sure to re-install screws that hold the machine to the stand legs.
10. Test the plotter.
11. If problems arise, contact Ioline Tech Support.

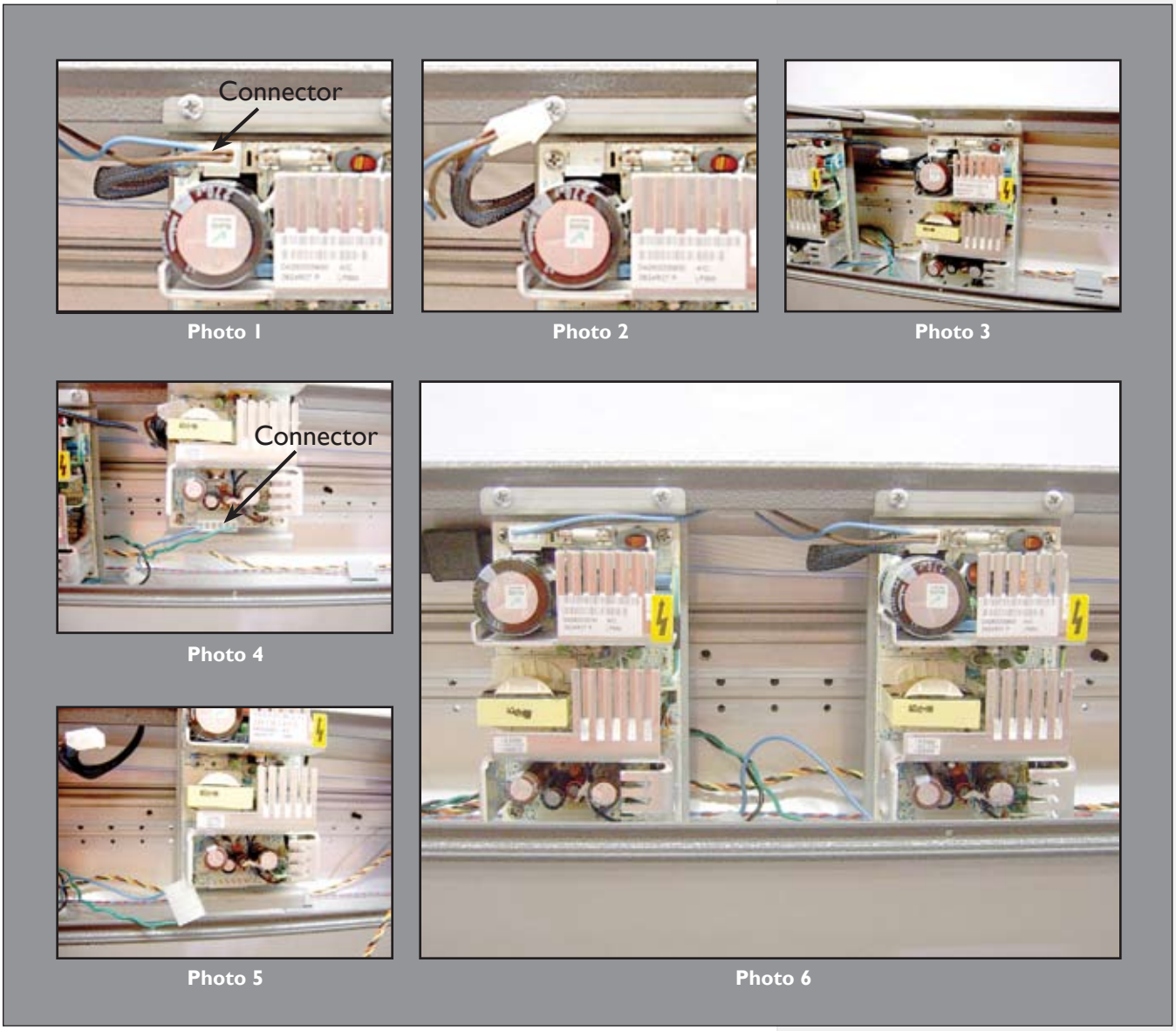

Figure 46. Power supply replacement.

Keypad procedures

Keypad replacement

Tools Required
■ Phillips head screwdriver
■ 11/32" wrench

1. Follow procedure for right cover removal.
2. Follow the procedure for bottom cover removal.
3. Unplug keypad cable from the main logic board and gently push through the hole in the right end plate (**Figure 47**, photos 1 & 2).
4. Rotate the machine back to normal operating position.
5. Remove the keypad resistor from the keypad (**Figure 47**, photos 3 & 4).
6. Follow the procedure for Y-transmission replacement later in this chapter and set the transmission aside.
7. Remove the two keypad mounting (11/32") nuts (**Figure 47**, photo 6).

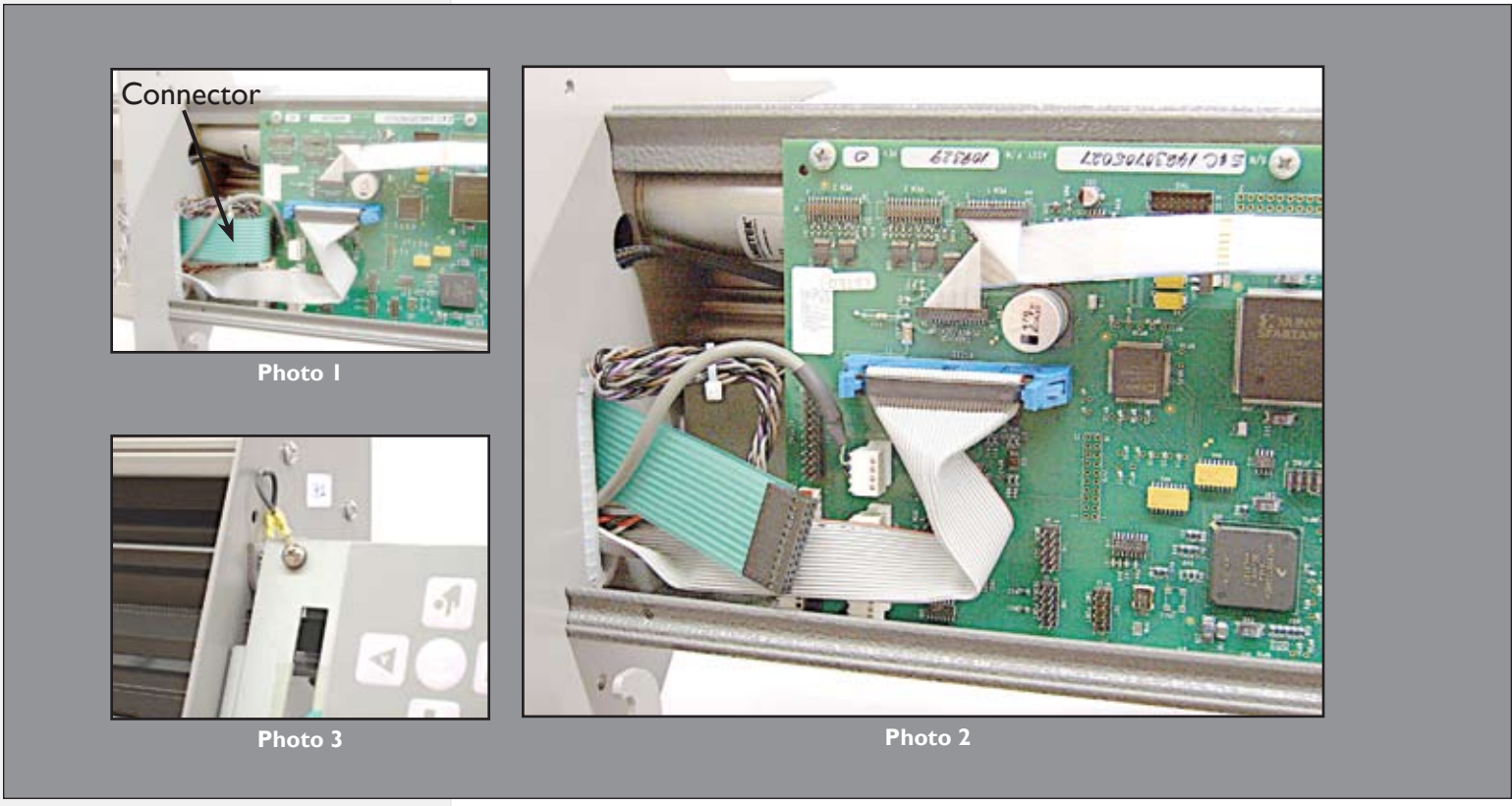

Figure 47. Bottom cover removal steps.

8. Remove keypad from the studs (**Figure 47**, photo 6).
9. Install the new keypad on the studs and tighten the nuts. Do Not over tighten. (**Figure 47**, photo 6).
10. Install the Y-axis transmission. (Follow Y-transmission procedure replacement in reverse).
11. Connect the keypad resistor to the hole in the keypad Do Not over tighten. (**Figure 47**, photos 3 & 4 & 5).
12. Rotate the machine to access the main logic board.
13. Loop the new keypad cable through the hole in the end plate and plug it into the new keypad cable for the main logic board. Take caution to plug the connector in properly. A missed row of pins will damage the main logic board and keypad. (**Figure 47**, photos 2 & 1) Note: **Pin #1** is marked with a sticker on the cable. Look on the main logic board for pin #1 and match pin to socket before plugging in the cable).
14. Install the bottom cover, as described earlier in this chapter.
15. Rotate the machine back to normal operating position and re-install screws that hold machine to stand legs.
16. Replace the right side cover.
17. Test the plotter.
18. If problems arise, contact Ioline Tech Support.

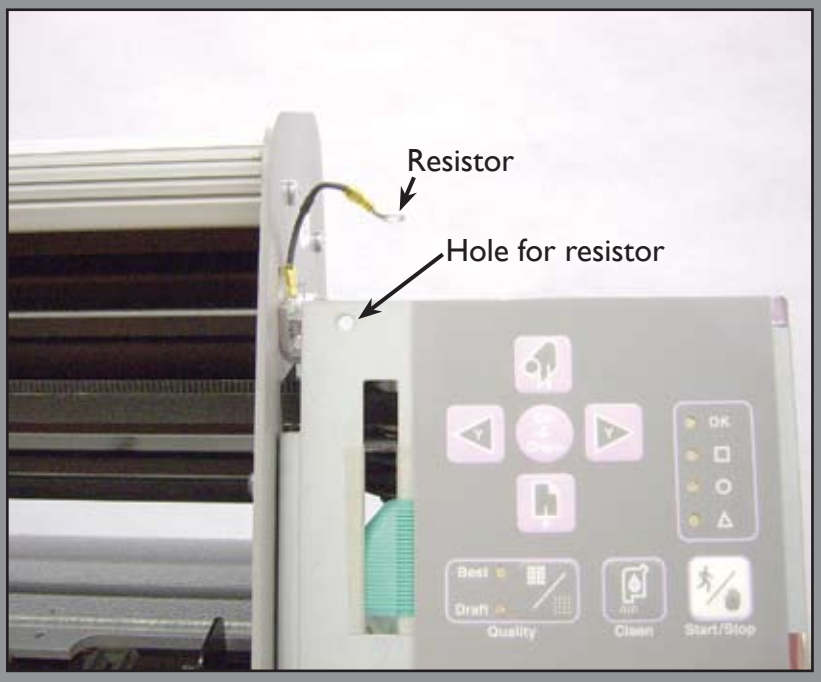

Photo 4

Photo 5

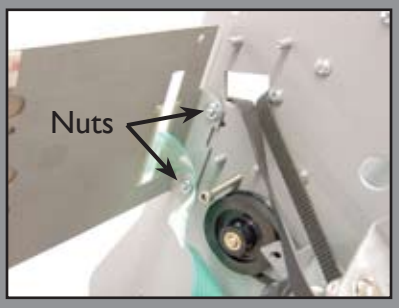

Photo 6

X-axis belt replacement

Tools Required	
■ Phillips head screwdriver	■ 11/32" wrench

1. Follow the right side cover removal procedure.
2. Hold the X-motor and unscrew two of the Phillips screws holding the motor (**Figure 48**, photos 1, 2 & 3). Leave the screw shown in **Figure 49**, photo 1 loose. Do not remove it.
3. Rotate the small pulley toward the front of the machine (**Figure 48**, photo 4).
4. Remove X-belt from both pulleys.
5. Install the new belt around both pulleys.
6. Rotate the small pulley toward the back of the machine (**Figure 48**, photo 3).
7. Install the two screws that hold motor (leave all three screws loose for now). (**Figure 48**, photos 2 & 1).
8. Push the pulley toward the back of machine and hold (for tension).

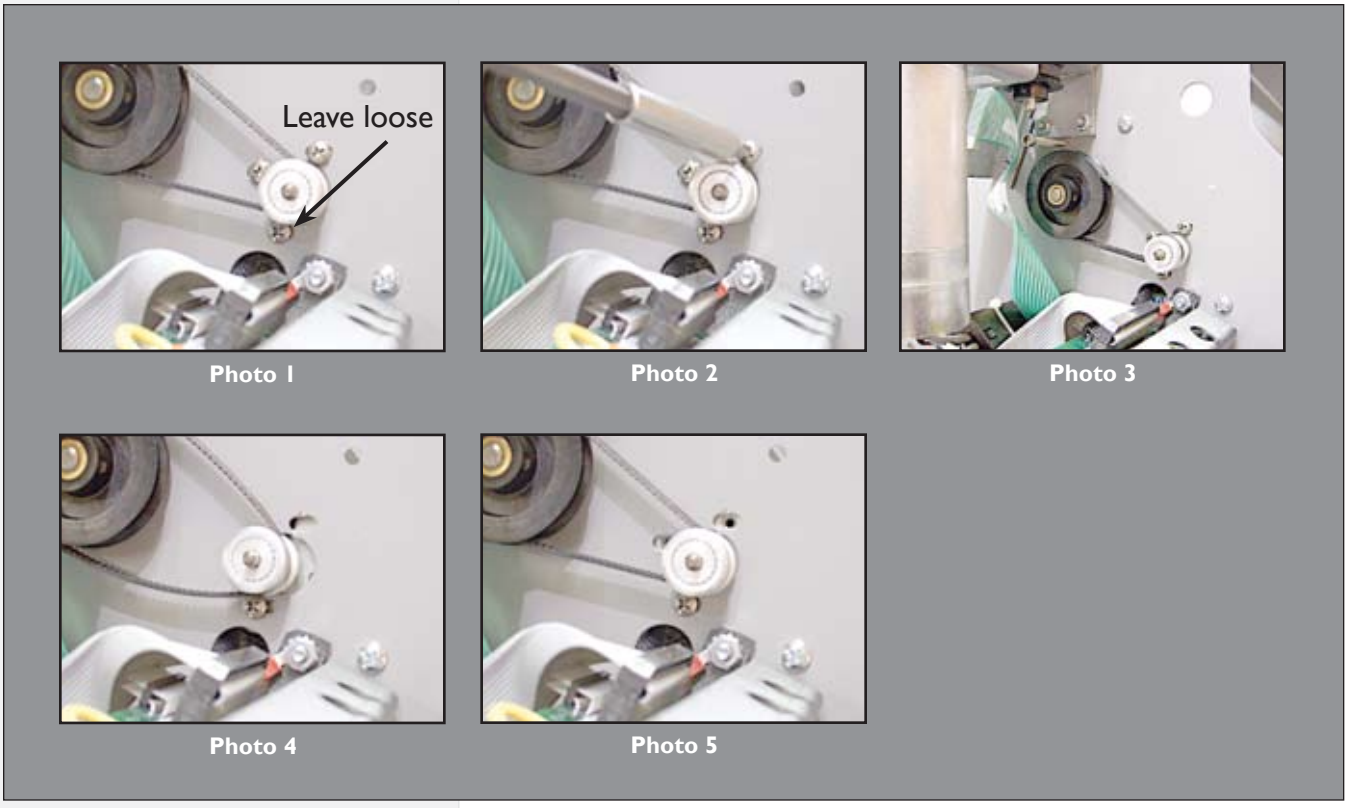

Figure 48. X-axis belt replacement.

9. Tighten the motor mounting screws while keeping tension on the belt. Do Not over tension the belt. (**Figure 48**, photo 1).
10. Replace the right side cover.
11. Test the plotter.
12. If problems arise, contact Ioline Tech Support.

Y-axis belt replacement

Tools Required	
■ Phillips head screwdriver	■ 11/32" wrench

1. Follow the procedure for the left cover removal.
2. Follow the procedure for the right cover removal.
3. Follow the procedure for the carriage removal (**Steps 1**, **2** & **3** only).
4. Remove the Y-axis belt from the machine (**Figure 49**, photos 1 & 2).
5. Remove the Y-axis belt from the tensioner. (See **Figure 49**, photos 3–5)
6. Install the new belt, following the instructions above in reverse. The teeth of the belt should face the shiny bearing surface (**Figure 49**, photo 6).
7. Install the Y-belt through left end plate (**Figure 49**, photo 2).
8. Put the belt through the right end plate and around the Y-transmission pulley and back through the hole in the right end plate (**Figure 49**, photo 1).
9. Attach the Y-belt to the carriage as described in the ***Carriage Replacement*** procedure earlier in this chapter.
10. Tighten the Y-axis belt tensioner.
11. Replace the right and left side covers.
12. Test the machine. If everything works properly.
13. If problems arise, contact Ioline Tech Support.

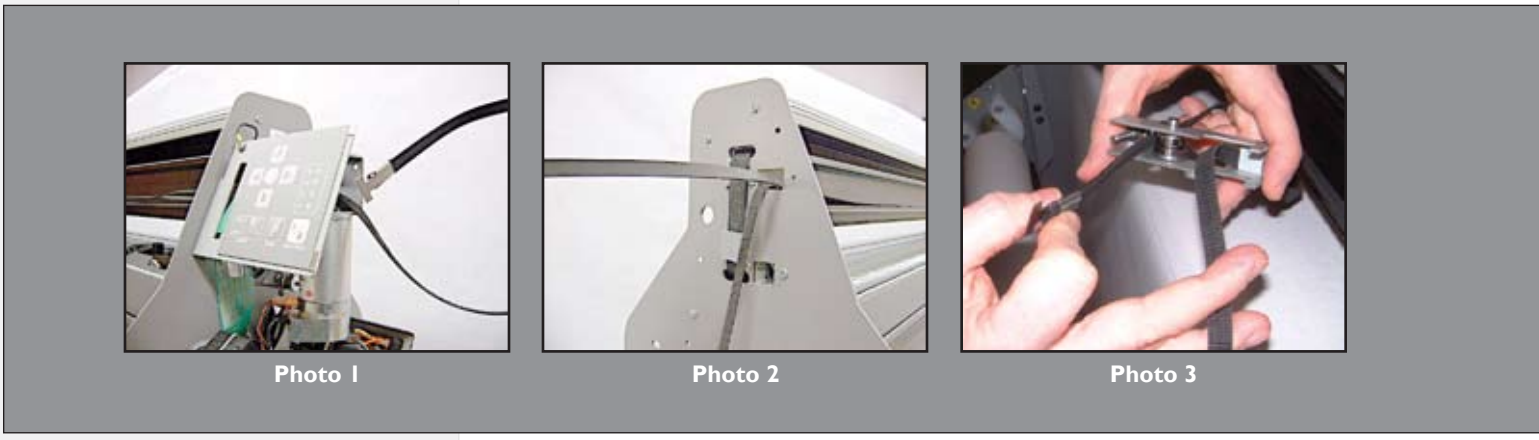

Photo 1 Photo 2 Photo 3

Figure 49. Y-axis belt replacement.

Photo 4

Photo 5

Photo 6

X-motor replacement

Tools Required	
■ Phillips head screwdriver	■ 11/32" wrench

1. Follow right cover removal procedure.
2. Unscrew two of the Phillips screws holding the X-motor. Leave the bottom screw loose; don't remove it. (**Figure 50**, photos 1, 2 & 3).
3. Rotate the small pulley toward the front of the machine (**Figure 50**, photo 4).
4. Remove X-belt from both pulleys and set aside.
5. Follow procedure for main logic board removal and set the board aside.
6. Unplug the encoder and power wires from the motor (inside the machine). (**Figure 50**, photos 5 & 6).
7. Unscrew the last Phillips screw holding the motor.
8. Remove the motor from the right end plate of the plotter.
9. Remove the motor pulley from the old motor and install on the new motor in approximately the same position. Lightly tighten one set screw for now.
10. Install the new motor with the bottom screw only on the right end plate of the plotter. (See **Figure 50**, photo 5 for correct rotation).
11. Install the encoder and power wires to new motor (**Figure 50**, photos 6 & 5).
12. Install the main logic board by following the main logic board replacement procedure in reverse.
13. Replace the bottom cover and flip machine back to normal operating position. Re-install the screws that hold the machine on the stand.
14. Install the X-belt on both pulleys, following **Steps 3–4** (above) in reverse (**Figure 50**, photo 4).
15. Rotate the small pulley toward the back of the machine (**Figure 50**, photo 3).
16. Install the two remaining screws that hold the motor. Leave loose for now. (**Figure 50**, photo 2).
17. Loosen and adjust the small motor pulley to line up with big pulley and belt. Tighten both set screws.
18. Push the pulley toward back of machine and apply tension. Take caution not to make the belt too tight, as this will cause excessive wear.
19. Tighten the motor mounting screws (**Figure 50**, photos 2 & 1).
20. Install the right side cover.

21. Test the plotter.
22. If problems arise, contact Ioline Tech Support.

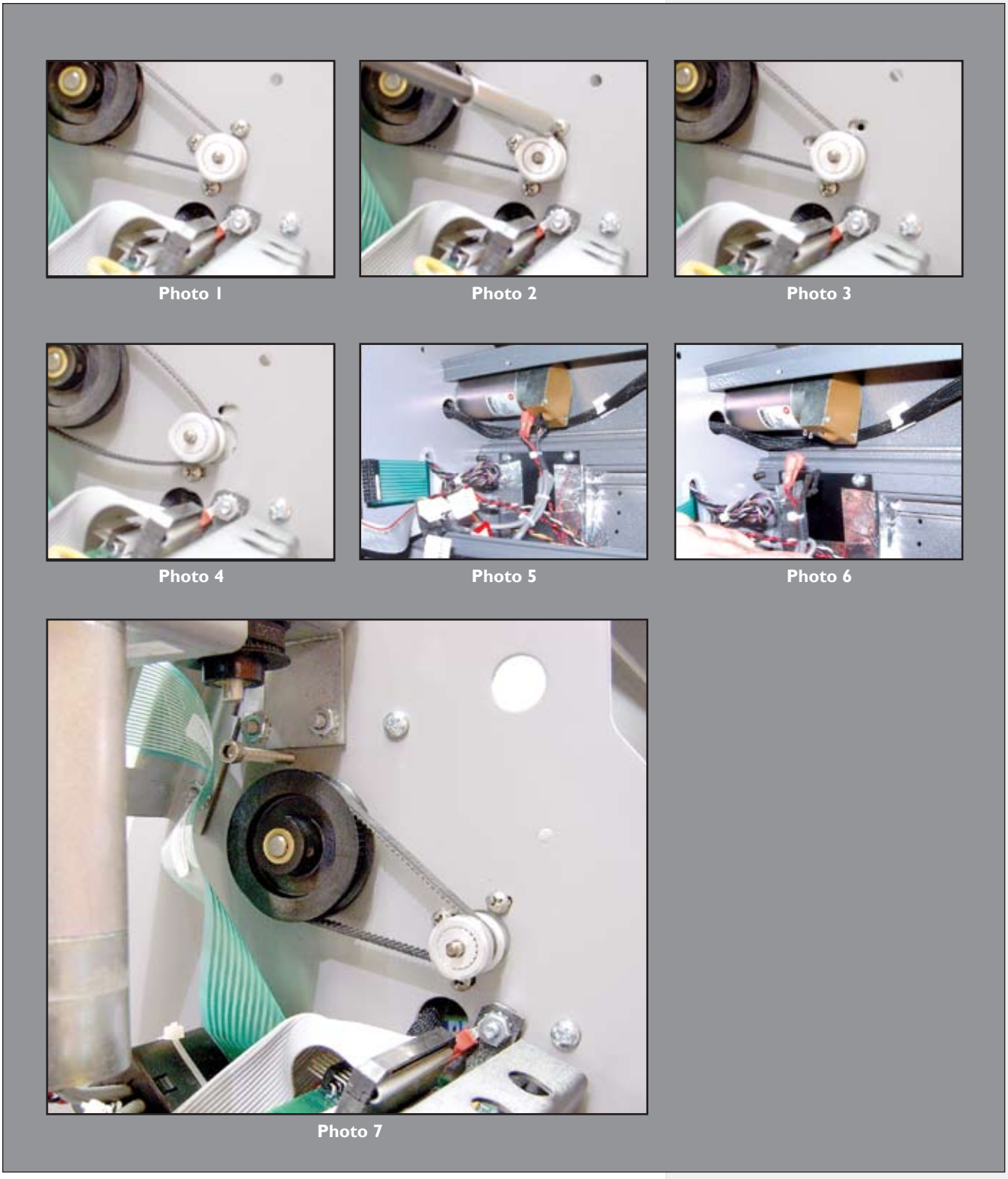

Figure 50. X-motor replacement.

Y-transmission replacement

Tools Required	
■ Phillips head screwdriver	■ 11/32" wrench

1. Follow procedure for carriage replacement (**Steps 1**, **2** & **3** only).
2. Pull Y-belt through right end plate (**Figure 51**, photo 1).
3. Remove the nuts holding the Y-transmission (11/32") nuts (**Figure 51**, photos 2 & 3). **Note: Take care unscrewing the top left nut where the keypad resistor is connected.**
4. Unplug the encoder and power wires from the motor.
5. Loop the Y-belt through the right end plate around the new transmission pulley and back through the hole in the right end plate.
6. Install the new transmission on the studs, taking up the slack in the Y-belt. (**Figure 51**, photos 4 & 5).
7. Install nuts until tight. Note: place the keypad resistor on the top left stud and tighten the nut. Do Not over tighten the resistor nut.
8. Plug the encoder and power wires into the bottom of the motor. Yellow = + (Positive, Red 501), Black = - (Negative, Black 502).
9. Install the belt ends on the carriage.

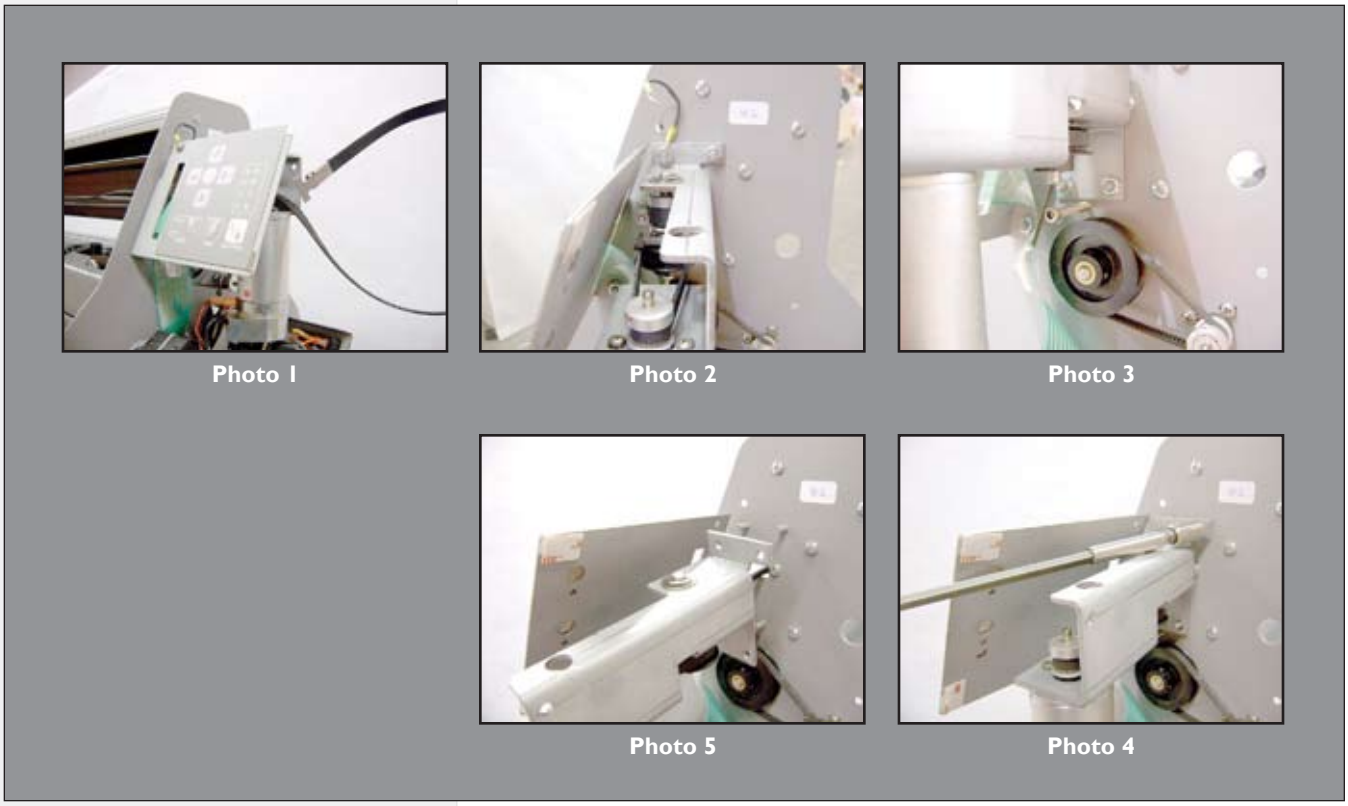

Figure 51. Y-transmission replacement.

10. Tighten the belt tensioner (Do Not over tighten).
11. Install the right and left side covers.
12. Test the machine.
13. If problems arise, contact Ioline Tech Support.

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FJ Printer Chassis BOM

(Bill of Materials—108792)

SEQ	Part Number	Description	QTY
1	108859	PLATEN ASSY, FJ8, ROHS	1
2	106756	TRAVERSE, I/S 600/28, ROHS	1
3	106858	DUST COVER, I/S-600/28, ROHS	1
4	108886	SHAFT, SQUARE, CAM, 15.0 LG, ROHS	1
5	108764	DRIVE SHAFT ASSY, FJ8	1
6	108769	PWHEEL ASSY, DOUBLE WHEEL, 12LB, ROHS	4
7	108806	CARRIAGE ASSY, 600FJ	1
8	108718	KEYPAD ASSY, FJ8, ROHS	1
9	108719	REAR PANEL ASSY, 600 FJ, ROHS	1
10	108900	ASSY,Y BELT, GT, 2MM, FJ8, ROHS	1
11	108758	Y TRANS ASSY, GT, 5080 CPI, ROHS	1
13	106684	LEVER ASSY, PINCHWHEEL, ROHS	1
14	108901	TENSIONER,ASSY, FLANGED BEAR, ROHS	1
15	109178	FAN ASSY, 24-48 V,W/CONN, ROHS	2
16	108797	PCB ASSY, MAIN, 600FJ, PROG	1
17	108794	PLATE, END, RIGHT, FJ8, ROHS	1
18	108795	PLATE, END, LEFT, 600FJ, ROHS	1
21	107646	PLATE, POWER SUPPLY, 3X5, ROHS	2
25	106231	PLATE, CAP, RIGHT, P600, ROHS	1
26	106232	PLATE, CAP, LEFT, SUMMIT 97, ROHS	1
34	108777	POWER SUPPLY, ROHS, 15V, 3X5, ROHS	2
36	106816	MOTOR, SERVO, 24V, ROHS	1
38	109165	CABLE ASSY, RBN, 1 HD, FJ8, ROHS	1
39	109253	CABLE ASSY,TU & POWER, INT, ROHS	1
41	107861	CABLE ASSY, FAN, SHORT, IJ02, ROHS	1
42	108757	BELT, GT 2MM, 105T, 6MM W, ROHS	1
43	108756	PULLEY, GT 2MM, 20T, 6MM W,4MM,ROHS	1
46	106649	LABEL, DRIVE AREA, ROHS	4
47	100705	PAD, PEN CAP, 1/4 DIA, ROHS	5
48	106652	RIVET, PLASTIC,.2 GR X .169OD, ROHS	8

FJ Printer Chassis BOM

(Cont.'d—108792)

SEQ	Part Number	Description	QTY
49	106695	FERRITE, SPLIT, 100MHZ, .74IDX1.6L, ROHS	1
52	107849	CAP,VINYL, .437"D X 1.5"L, ROHS	2
54	106241	WSHR,#8-32,.190ID,.416OD,.080THK,ROHS	2
58	104180	SCREW,#8,.50 LG,SLF TAP,PHP,SE ROHS	25
59	100026	SCREW #6-32, .5 LG, PHP, SEMS, ROHS	11
61	104590	SCREW #8, .50 LG, ST, FHP, ROHS	10
63	102726	SETSCREW #10-32, .75 LG, STEEL,ROHS	6
64	104013	NUT, #8-32, KEP, ROHS	15
66	100279	CONN, CABLE CLIP, 1 IN, ROHS	13
67	103026	CONN, CABLE CLIP, .18 DIA, ROHS	3
68	103027	TYRAP, .1 IN X 5 3/4 LG, ROHS	20
69	104726	GROMMET STRIP, CONTINUOUS 7/64, ROHS	6
72	108437	TAPE, FOAM, VHB, 5925, .025T, .625W, ROHS	9
74	106786	TAPE, DOUBLE COATED, .25 WIDE, ROHS	81
75	106686	STRIP, CUTTING, SC98, ROHS	81
77	106951	SPRING,TORSN, .53ID,.045 WIRE,ROHS	1
81	108857	TAKE-UP ASSY, RIGHT, FJ8, ROHS	1
82	109270	CABLE ASSY, POWER SUPPLY, FJ8, ROHS	1
88	108930	TAPE, FOIL, 2 IN, ROHS	10
89	107044	LABEL,WARNING, SHOCK, SMALL, ROHS	2
90	107862	CABLE ASSY, FAN, LONG, IJ02, ROHS	1
92	104179	SCREW #10-32, .375 LG, PHP, SEMS, ROHS	2
93	108799	BRACKET ASSY,SERVICE STATION, 600FJ, ROHS	1
94	108801	CAP ASSY, FJ8, ROHS	1
96	109269	CABLE ASSY, PCB,TU, FJ8, ROHS	1
97	108839	BOTTOM COVER ASSY, RIGHT, FJ8, ROHS	1
98	108840	BOTTOM COVER ASSY, LEFT, FJ8, ROHS	1
101	102219	LEVELER, 1.5 PAD, 3 IN ADJUST, ROHS	2
102	102220	NUT, #3/8-16, HEX, ROHS	2
105	108836	MAGNET, NEO, .50 OD, .25 LG, ROHS	1
106	108796	CHANNEL, RIBBON CABLE, 600FJ, ROHS	1
107	108771	SPACER, DSHAFT, PL, 32.30LG, ROHS	2
108	108600	CABLE ASSY, PPR OUT, FJ8, ROHS	1
109	100046	SCREW #8-32, 1.25 LG, SHC, ROHS	1
110	103740	TAPE, FOAM, .5 IN, .025 THICK, ROHS	2
111	109048	GROUND, 1M OHM,W/TERM, ROHS	1
112	104008	SCREW #8-32, .375 LG, PHP SEMS,ROHS	1

FJ Printer Packing List BOM

(Bill of Materials—108790)

SEQ	Part Number	Description	QTY
1	108792	CHASSIS, FJ8	1
2	106174	CROSSMEMBER, 600/28, ROHS	1
5	108261	COVER, RIGHT, APPAREL, ROHS	1
6	105166	COVER, LEFT END, S88, ROHS	1
8	106264	SHAFT ASSY, FEED, 600, ROHS	1
9	106833	TAKE-UP SHAFT ASSY, I/S 28, ROHS	1
10	106244	DANCER BAR ASSY, FRONT P600, ROHS	1
12	108386	COVER, TAKE-UP APPAREL, ROHS	1
13	106284	BOX, SHIP, 600/28, ROHS	1
14	108823	PACKING LIST, FJ8	1
15	108826	ACCY KIT, FJ8	1
18	108822	LABEL, CARTON END, FJ8	2
19	103560	LABEL, SHIPPING CARTON, IOLINE, 20	2
20	108287	LABEL, CE, FLEXJET, ROHS	1
21	107114	LABEL, FRONT, LIGHT GRAY, ROHS	1
23	104926	STANDOFF, #8-32, 5.25 LG, ROHS	2
24	104725	STANDOFF, #8-32, 1.75 LG, ROHS	2
25	106241	WSHR,#8-32,.190ID,.416OD,.080THK,ROHS	8
26	101581	SCREW #8-32, .375 FHP, ROHS	6
30	106339	STRAIN RELIEF,PLASTIC,.30-.35ID ROHS	1
34	108727	LEG ASSY, RIGHT, FJ8, ROHS	1
35	108728	LEG ASSY, LEFT, FJ8, ROHS	1
37	108837	TAKE-UP ASSY, LEFT, FJ8, ROHS	1
38	100113	NUT, #1/4-20, HEX, NYLOC, ROHS	4
39	104008	SCREW #8-32, .375 LG, PHP SEMS,ROHS	4
41	108824	KIT, QUICK START, FJ8	1

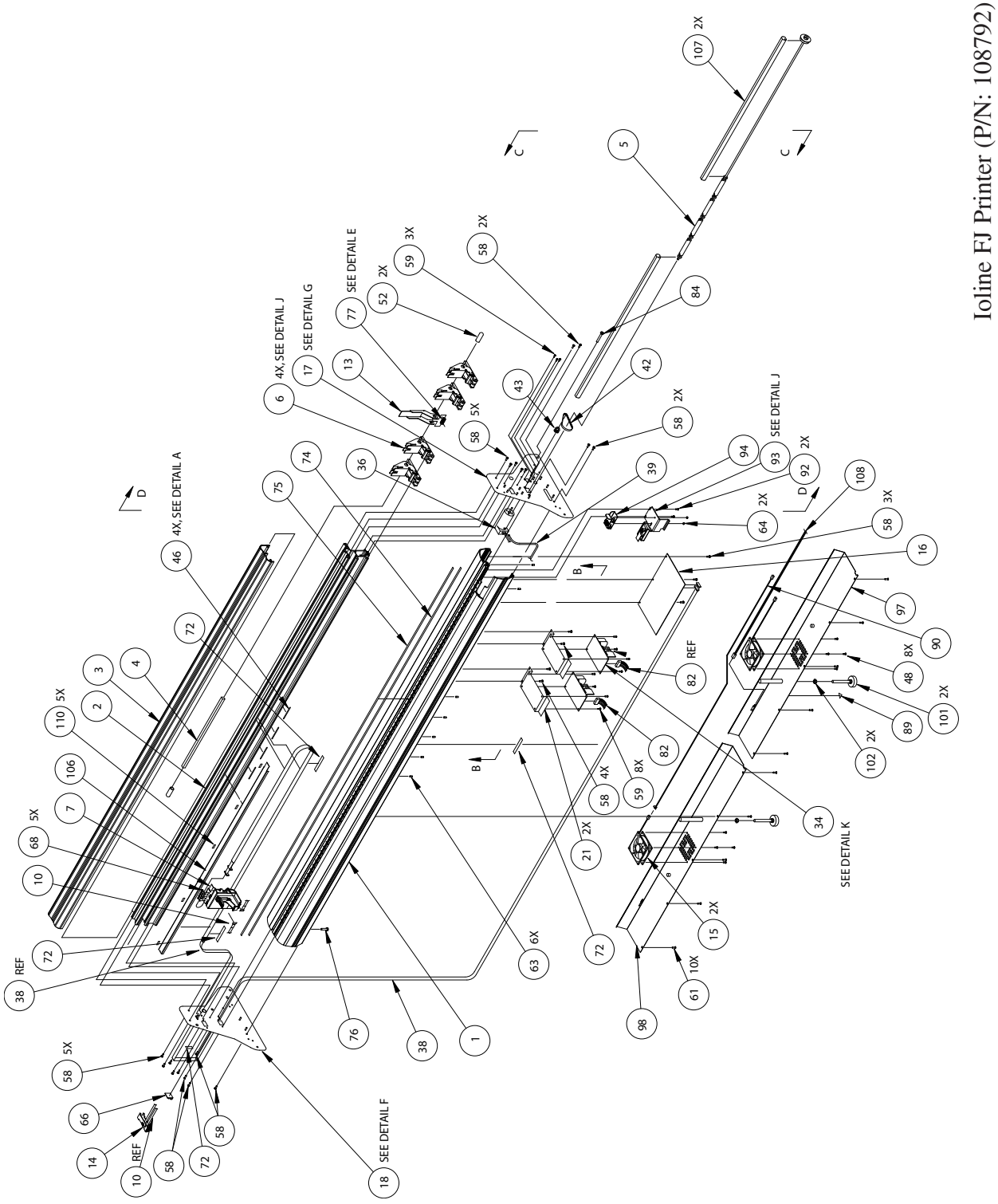

Figure 52. Ioline FJ Printer chassis (exploded view A).

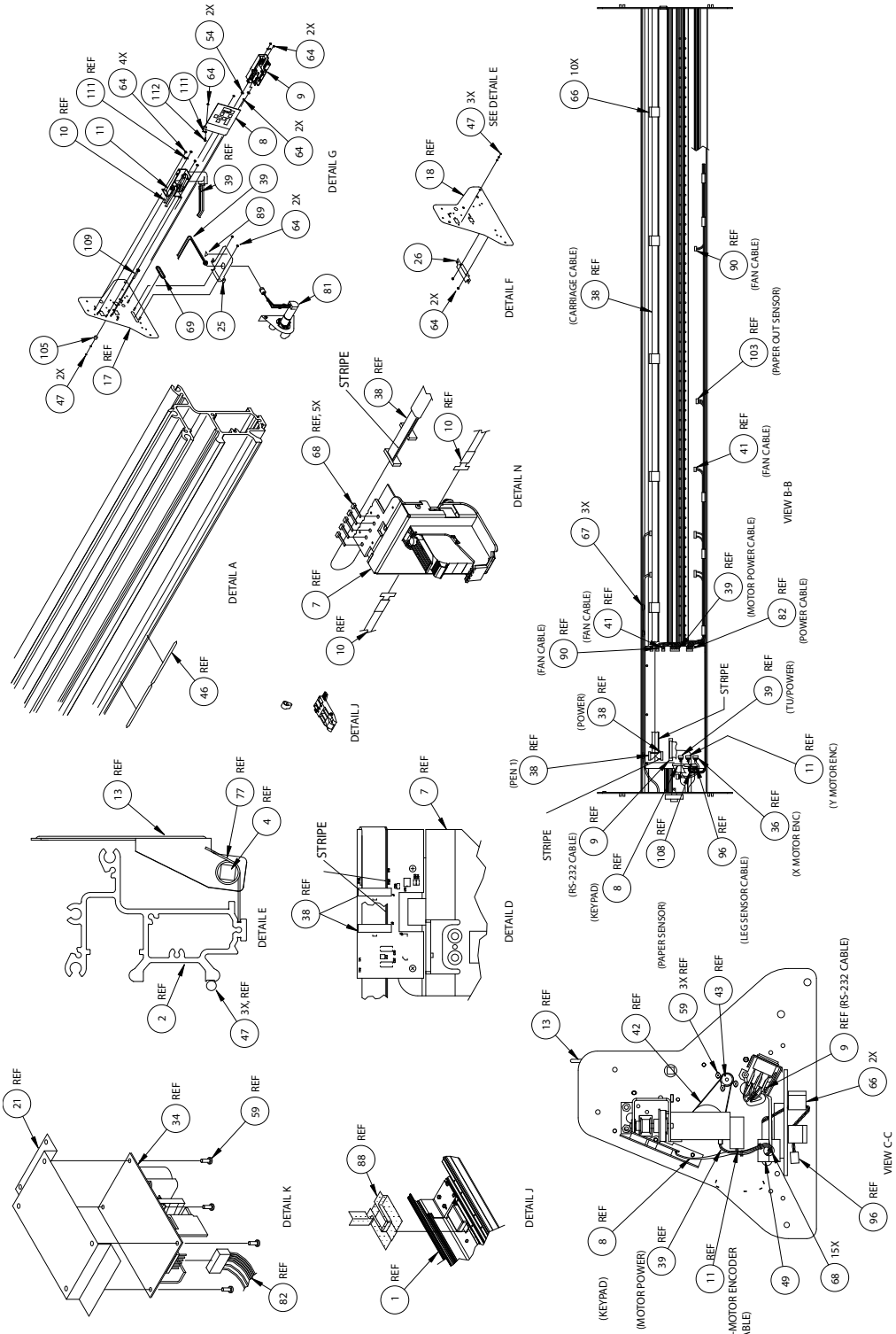

Figure 53. Ioline FJ Printer chassis (exploded view B).

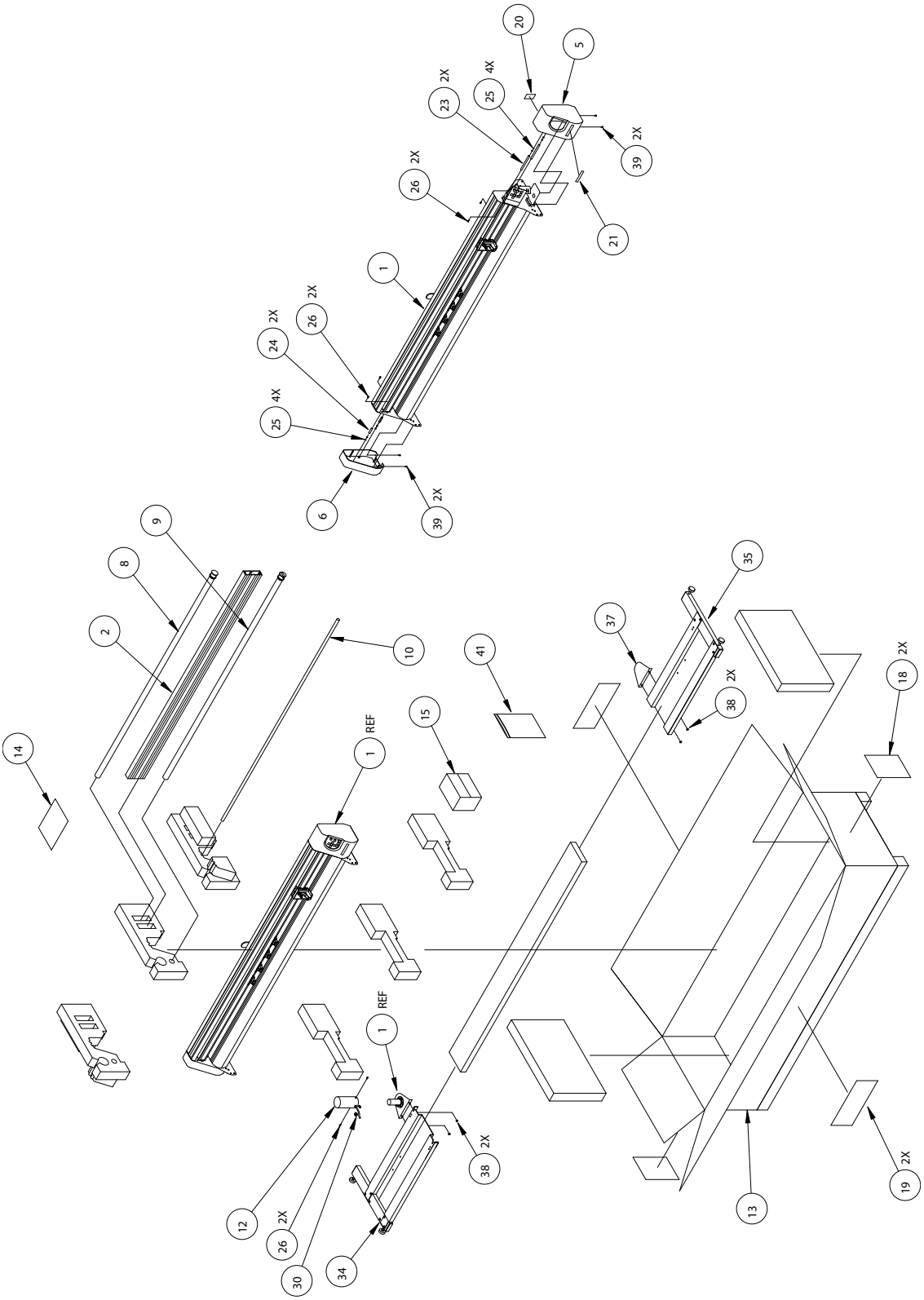

Figure 54. FJ Printer Packing List.

FJ-eX Chassis BOM

(Bill of Materials—108862)

SEQ	Part Number	Description	QTY
1	108864	PLATEN ASSY, FJEX, ROHS	1
2	107428	TRAVERSE, 600AEX, ROHS	1
3	107431	DUSTCOVER, 600AEX, ROHS	1
4	106660	SHAFT, CAM, SC98, 24, ROHS	1
5	108867	DRIVE SHAFT ASSY, FJEX, ROHS	1
6	108769	PWHEEL ASSY, DOUBLE WHEEL, 12LB, ROHS	6
7	109335	CARRIAGE ASSY, 600FJ, ROHS	1
8	108718	KEYPAD ASSY, FJ8, ROHS	1
9	109337	REAR PANEL ASSY, 600 FJ, ROHS	1
10	108863	Y-BELT ASSY, FJEX, ROHS	1
11	108758	Y TRANS ASSY, GT, 5080 CPI, ROHS	1
13	106684	LEVER ASSY, PINCHWHEEL, ROHS	1
14	108901	TENSIONER, ASSY, FLANGED BEAR, ROHS	1
15	109178	FAN ASSY, 24-48 V, W/CONN, ROHS	3
16	108847	PCB ASSY, MAIN, FJEX, PROG	1
17	108794	PLATE, END, RIGHT, FJ8, ROHS	1
18	108795	PLATE, END, LEFT, 600FJ, ROHS	1
21	107646	PLATE, POWER SUPPLY, 3X5, ROHS	2
25	106231	PLATE, CAP, RIGHT, P600, ROHS	1
26	106232	PLATE, CAP, LEFT, SUMMIT 97, ROHS	1
34	108777	POWER SUPPLY, ROHS, 15V, 3X5, ROHS	2
36	106816	MOTOR, SERVO, 24V, ROHS	1
38	109166	CABLE ASSY, RBN, 1 HD, FJEX, ROHS	1
39	109253	CABLE ASSY, TU & POWER, INT, ROHS	1
41	107861	CABLE ASSY, FAN, SHORT, IJ02, ROHS	2
42	108757	BELT, GT 2MM, 105T, 6MM W, ROHS	1
43	108756	PULLEY, GT 2MM, 20T, 6MM W,4MM,ROHS	1
46	106649	LABEL, DRIVE AREA, ROHS	6
47	100705	PAD, PEN CAP, 1/4 DIA, ROHS	5
48	106652	RIVET, PLASTIC,.2 GR X .169OD, ROHS	12
49	106695	FERRITE, SPLIT, 100MHZ, .74IDX1.6L, ROHS	1
52	107849	CAP,VINYL, .437"D X 1.5"L, ROHS	2
54	106241	WSHR,#8-32,.190ID,.416OD,.080THK,ROHS	4
58	104180	SCREW,#8,.50 LG,SLF TAP,PHP,SE ROHS	25
59	100026	SCREW #6-32, .5 LG, PHP, SEMS, ROHS	11
61	104590	SCREW #8, .50 LG, ST, FHP, ROHS	14
63	102726	SETSCREW #10-32, .75 LG, STEEL,ROHS	8
64	104013	NUT, #8-32, KEP, ROHS	14
66	100279	CONN, CABLE CLIP, 1 IN, ROHS	13
67	103026	CONN, CABLE CLIP, .18 DIA, ROHS	3

FJ-eX Chassis BOM

(Cont.'d—108862)

SEQ	Part Number	Description	QTY
68	103027	TYRAP, .1 IN X 5 3/4 LG, ROHS	20
69	104726	GROMMET STRIP, CONTINUOUS 7/64, ROHS	6
72	108437	TAPE, FOAM, VHB, 5925, .025T, .625W, ROHS	9
74	106786	TAPE, DOUBLE COATED, .25 WIDE, ROHS	94
75	106686	STRIP, CUTTING, SC98, ROHS	94
77	106951	SPRING, TORSN, .53ID,.045 WIRE,ROHS	1
81	108857	TAKE-UP ASSY, RIGHT, FJ8, ROHS	1
82	109270	CABLE ASSY, POWER SUPPLY, FJ8, ROHS	1
88	108930	TAPE, FOIL, 2 IN, ROHS	10
89	107044	LABEL, WARNING, SHOCK, SMALL, ROHS	2
90	107862	CABLE ASSY, FAN, LONG, IJ02, ROHS	1
92	104179	SCREW #10-32, .375 LG, PHP, SEMS, ROHS	2
93	108799	BRACKET ASSY,SERVICE STATION, 600FJ, ROHS	1
94	108801	CAP ASSY, FJ8, ROHS	1
96	109269	CABLE ASSY, PCB, TU, FJ8, ROHS	1
97	108842	BOTTOM COVER ASSY, RIGHT, FJEX, ROHS	1
98	108843	BOTTOM COVER ASSY, LEFT, FJEX, ROHS	1
101	102219	LEVELER, 1.5 PAD, 3 IN ADJUST, ROHS	2
102	102220	NUT, #3/8-16, HEX, ROHS	2
105	108836	MAGNET, NEO, .50 OD, .25 LG, ROHS	1
106	108796	CHANNEL, RIBBON CABLE, 600FJ, ROHS	1
107	108884	SPACER, DSHAFT, PL, 35.68 LG, ROHS	2
108	108600	CABLE ASSY, PPR OUT, FJ8, ROHS	1
109	100046	SCREW #8-32, 1.25 LG, SHC, ROHS	1
110	103740	TAPE, FOAM, .5 IN, .025 THICK, ROHS	2

FJ-eX Printer Packing List BOM

(Bill of Materials—108860)

SEQ	Part Number	Description	QTY
1	108862	CHASSIS, FJEX	1
2	107432	CROSSMEMBER, 600AEX, ROHS	2
5	108261	COVER, RIGHT, APPAREL, ROHS	1
6	105166	COVER, LEFT END, S88, ROHS	1
8	107536	SHAFT, ASSY, FEED, 600AEX, ROHS	1
9	107535	SHAFT ASSY, TAKEUP, 600AEX, ROHS	1
10	107534	DANCER BAR ASSY, FRONT, 600AEX, ROHS	1
12	108386	COVER, TAKE-UP APPAREL, ROHS	1
13	107237	BOX, SHIPPING, AEX	1
14	108781	PACKING LIST, FJEX	1
15	108826	ACCY KIT, FJ8	1
18	108822	LABEL, CARTON END, FJ8	2
19	103560	LABEL, SHIPPING CARTON, IOLINE, 20	2
20	108287	LABEL, CE, FLEXJET, ROHS	1
21	107114	LABEL, FRONT, LIGHT GRAY, ROHS	1
23	104926	STANDOFF, #8-32, 5.25 LG, ROHS	2
24	104725	STANDOFF, #8-32, 1.75 LG, ROHS	2
25	106241	WSHR,#8-32,.190ID,.416OD,.080THK,ROHS	8
26	101581	SCREW #8-32, .375 FHP, ROHS	6
30	106339	STRAIN RELIEF,PLASTIC,.30-.35ID ROHS	1
34	108727	LEG ASSY, RIGHT, FJ8, ROHS	1
35	108728	LEG ASSY, LEFT, FJ8, ROHS	1
37	108837	TAKE-UP ASSY, LEFT, FJ8, ROHS	1
38	100113	NUT, #1/4-20, HEX, NYLOC, ROHS	4
39	104008	SCREW #8-32, .375 LG, PHP SEMS,ROHS	4
41	108824	KIT, QUICK START, FJ8	1

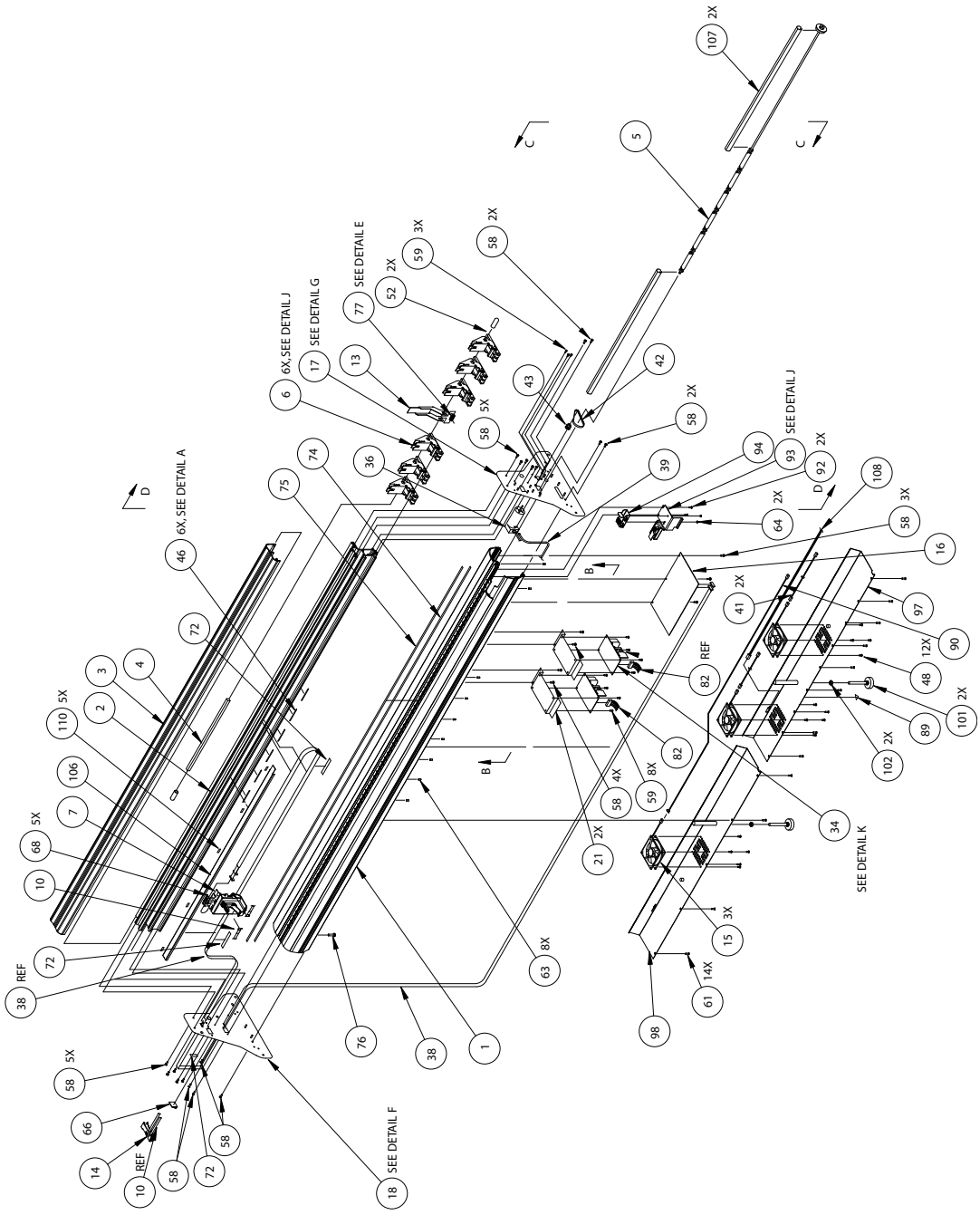

Figure 55. Ioline FJ-eX Printer chassis (exploded view A).

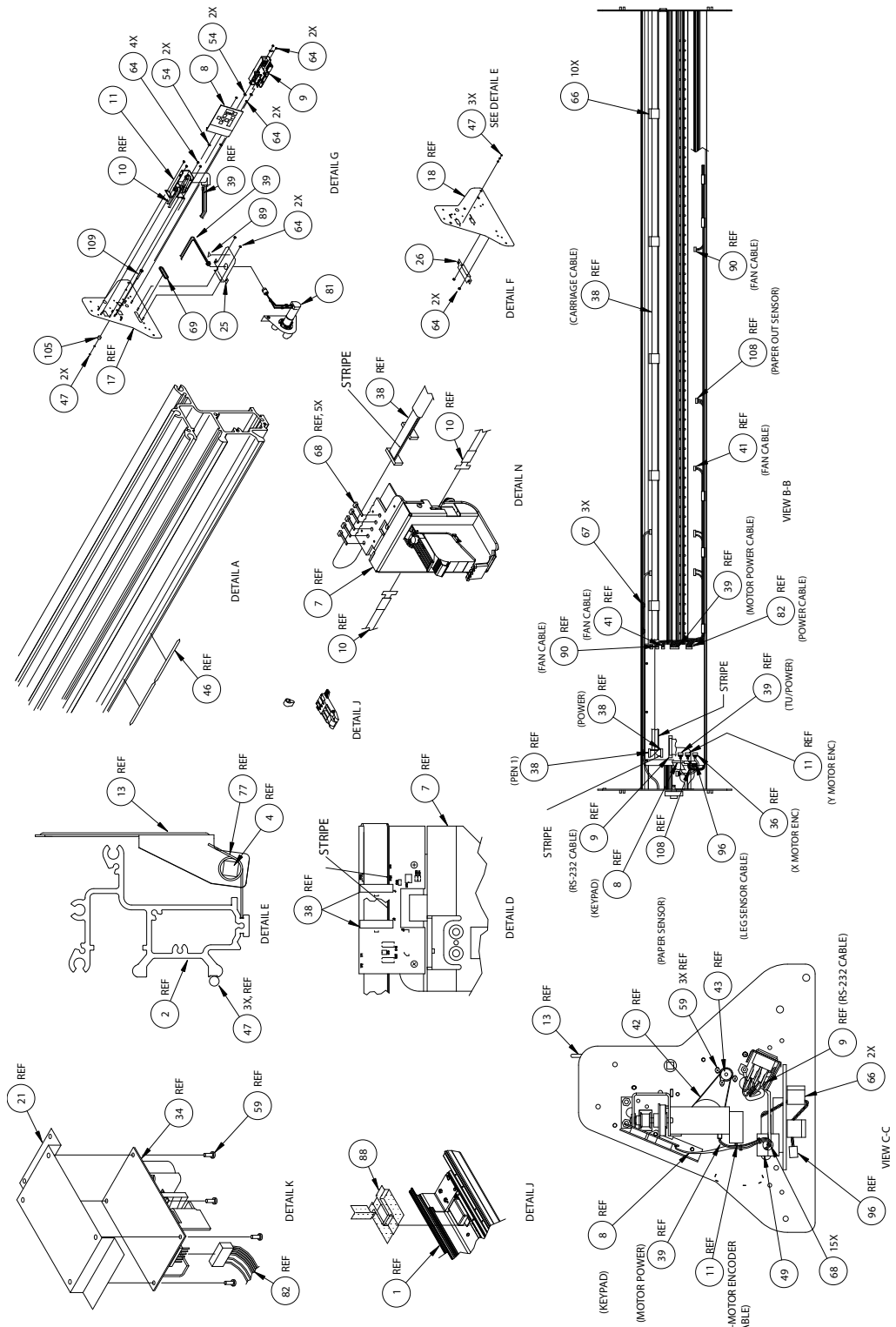

Figure 56. Ioline FJ-eX Printer chassis (exploded view B).

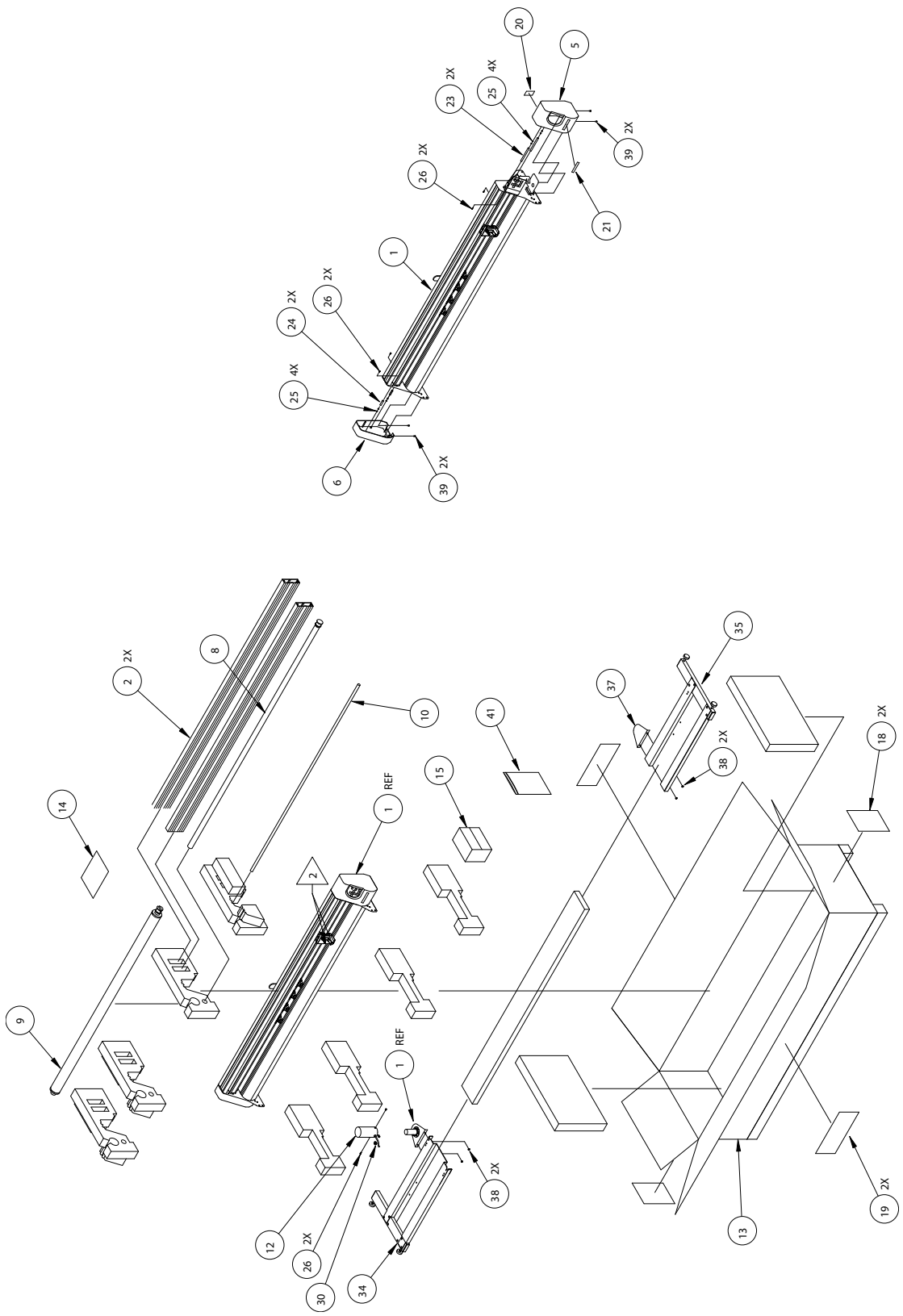

Figure 57. Ioline FJ-eX Printer Packing List.

StudioJet Chassis BOM

(Bill of Materials—109002)

SEQ	Part Number	Description	QTY
1	109007	DRIVE SHAFT ASSY, FJ40, ROHS	1
3	109337	REAR PANEL ASSY, 600 FJ, ROHS	1
4	109010	CARRIAGE ASSY, FJ40, ROHS	1
5	109006	ASSY Y-BELT, GT2MM, FJ40, ROHS	1
6	108777	POWER SUPPLY, ROHS, 15V, 3X5, ROHS	2
7	106816	MOTOR, SERVO, 24V, ROHS	1
8	109159	CABLE ASSY, RBN, 1HD, FJ40, ROHS	1
9	109178	FAN ASSY, 24-48 V, W/CONN, ROHS	1
10	106549	CABLE ASSY, MOTOR POWER, SC98, ROHS	1
11	108757	BELT, GT 2MM, 105T, 6MM W, ROHS	1
12	109011	PCB ASSY, MAIN, FJ40, PROG, ROHS	1
13	108758	Y TRANS ASSY, GT, 5080 CPI, ROHS	1
15	108756	PULLEY, GT 2MM, 20T, 6MM W,4MM,ROHS	1
16	100705	PAD, PEN CAP, 1/4 DIA, ROHS	4
17	103026	CONN, CABLE CLIP, .18 DIA, ROHS	6
18	100026	SCREW #6-32, .5 LG, PHP, SEMS, ROHS	11
19	104013	NUT, #8-32, KEP, ROHS	9
21	100279	CONN, CABLE CLIP, 1 IN, ROHS	7
23	103740	TAPE, FOAM, .5 IN, .025 THICK, ROHS	2
25	106649	LABEL, DRIVE AREA, ROHS	2
26	104180	SCREW,#8,.50 LG,SLF TAP,PHP,SE ROHS	25
29	107849	CAP,VINYL, .437"D X 1.5"L, ROHS	2
30	106684	LEVER ASSY, PINCHWHEEL, ROHS	1
31	106688	PLATE, END, RIGHT, SC98, ROHS	1
32	106689	PLATE END, LEFT, SC98, ROHS	1
33	108718	KEYPAD ASSY, FJ8, ROHS	1
34	108901	TENSIONER, ASSY, FLANGED BEAR, ROHS	1
37	106652	RIVET, PLASTIC,.2 GR X .169OD, ROHS	4
41	106724	COVER, DUST, SC98, 40, ROHS	1
42	109003	PLATEN, FJ40, ROHS	1
43	107646	PLATE, POWER SUPPLY, 3X5, ROHS	2
44	106727	COVER, BOTTOM, SC98, 40, ROHS	1
46	109009	SPACER, PL, 18.80 LG, ROHS	2
47	102726	SETSCREW #10-32, .75 LG, STEEL,ROHS	4
53	108886	SHAFT, SQUARE, CAM, 15.0 LG, ROHS	1
54	106723	TRAVERSE, SC98, 40, ROHS	1
55	106695	FERRITE, SPLIT, 100MHZ, .74IDX1.6L, ROHS	1
59	106951	SPRING, TORSN, .53ID,.045 WIRE,ROHS	1
60	104590	SCREW #8, .50 LG, ST, FHP, ROHS	7
64	102281	SCREW #10-32, 1.0 LG, PHP, ROHS	1

StudioJet Chassis BOM

(Cont.'d—109002)

SEQ	Part Number	Description	QTY
66	108769	PWHEEL ASSY, DOUBLE WHEEL, 12LB, ROHS	2
67	109270	CABLE ASSY, POWER SUPPLY, FJ8, ROHS	1
68	103726	TYRAP, .1 IN X 3 IN, BLACK, ROHS	5
69	107044	LABEL, WARNING, SHOCK, SMALL, ROHS	1
70	107861	CABLE ASSY, FAN, SHORT, IJ02, ROHS	1
71	107738	SENSOR, OPTICAL, 1 PIECE, ROHS	1
72	108946	NUT, #4-40, HEX, THIN, NYLOC, ROHS	2
73	108600	CABLE ASSY, PPR OUT, FJ8, ROHS	1
74	109048	GROUND, 1M OHM, W/TERM, ROHS	1
75	104008	SCREW #8-32, .375 LG, PHP SEMS,ROHS	1
76	103260	SCREW #4-40, .75 LG, PHP, ROHS	2
77	109005	PLUG, 7/8" X .10" PL, ROHS	1
78	104726	GROMMET STRIP, CONTINUOUS 7/64, ROHS	5

StudioJet Printer Packing List BOM

(Bill of Materials—109000)

SEQ	Part Number	Description	QTY
1	108822	LABEL, CARTON END, FJ8	2
2	109013	PACKING LIST, FJ40	1
3	108824	KIT, QUICK START, FJ8	1
4	109002	CHASSIS, STUDIO JET	1
5	108253	LEG, SIGN CUTTER, ROHS	2
6	105976	CROSSMEMBER, 40, SC98, ROHS	1
9	106745	FOOT ASSY, SC98, ROHS	2
10	106741	ROLLER, LONG, SC98/40	1
11	103560	LABEL, SHIPPING CARTON, IOLINE, 20	2
12	106565	BOX, SHIPPING, SC98, 40	1
13	101581	SCREW #8-32, .375 FHP, ROHS	4
14	104926	STANDOFF, #8-32, 5.25 LG, ROHS	2
15	104725	STANDOFF, #8-32, 1.75 LG, ROHS	2
16	104008	SCREW #8-32, .375 LG, PHP SEMS,ROHS	1
17	106618	COVER, LEFT END, SC98, ROHS	1
18	106619	COVER, RIGHT END, SC98, ROHS	1
19	105921	TYRAP, 28" CABLETIE NAT. NYLON, ROHS	1
20	107114	LABEL, FRONT, LIGHT GRAY, ROHS	1
21	108287	LABEL, CE, FLEXJET, ROHS	1
22	109014	ACCY KIT, FJ40	1
23	101031	FOAM BLOCK, 2 IN X 2 IN X 2 IN	2

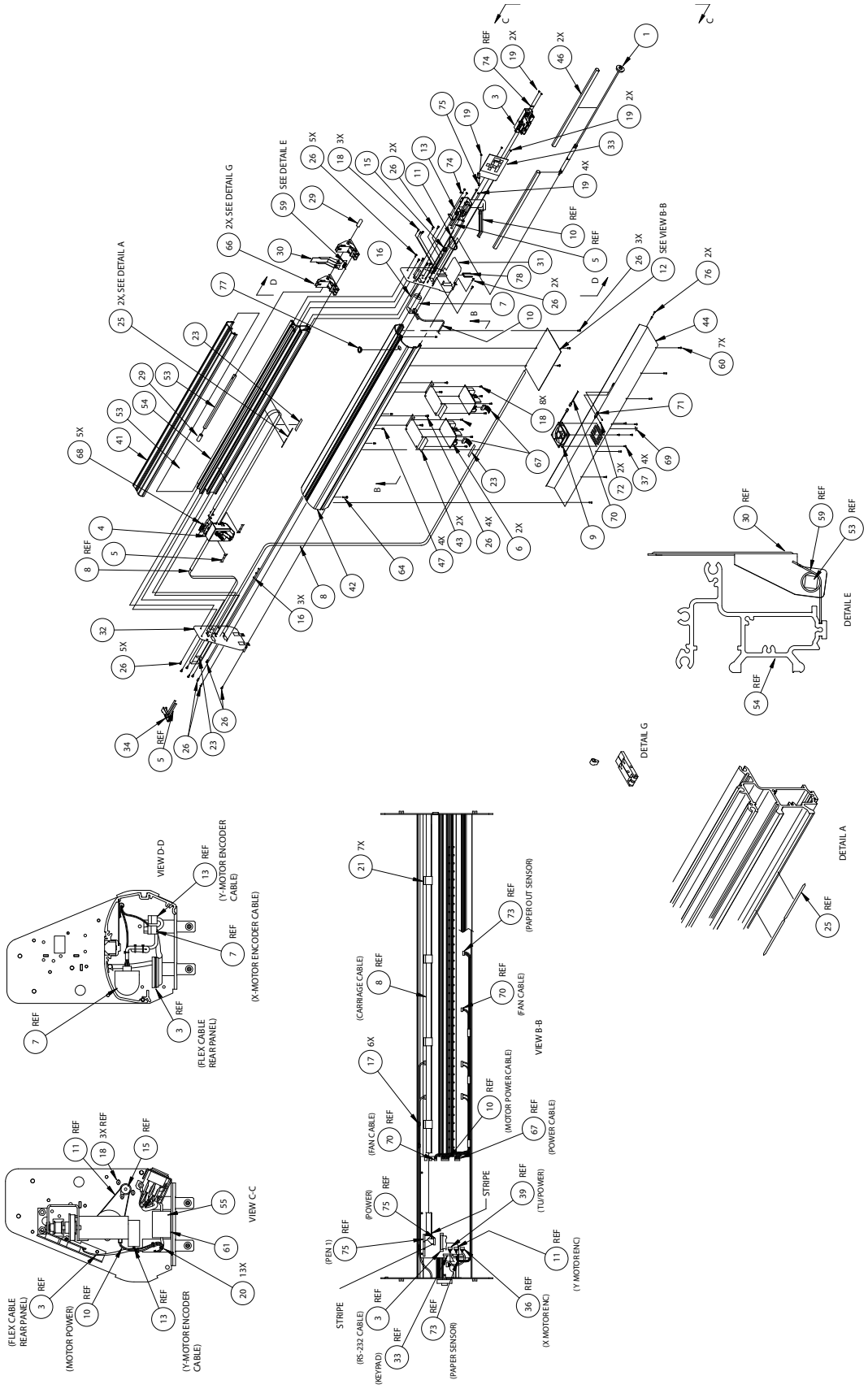

Figure 58. StudioJet chassis (exploded).

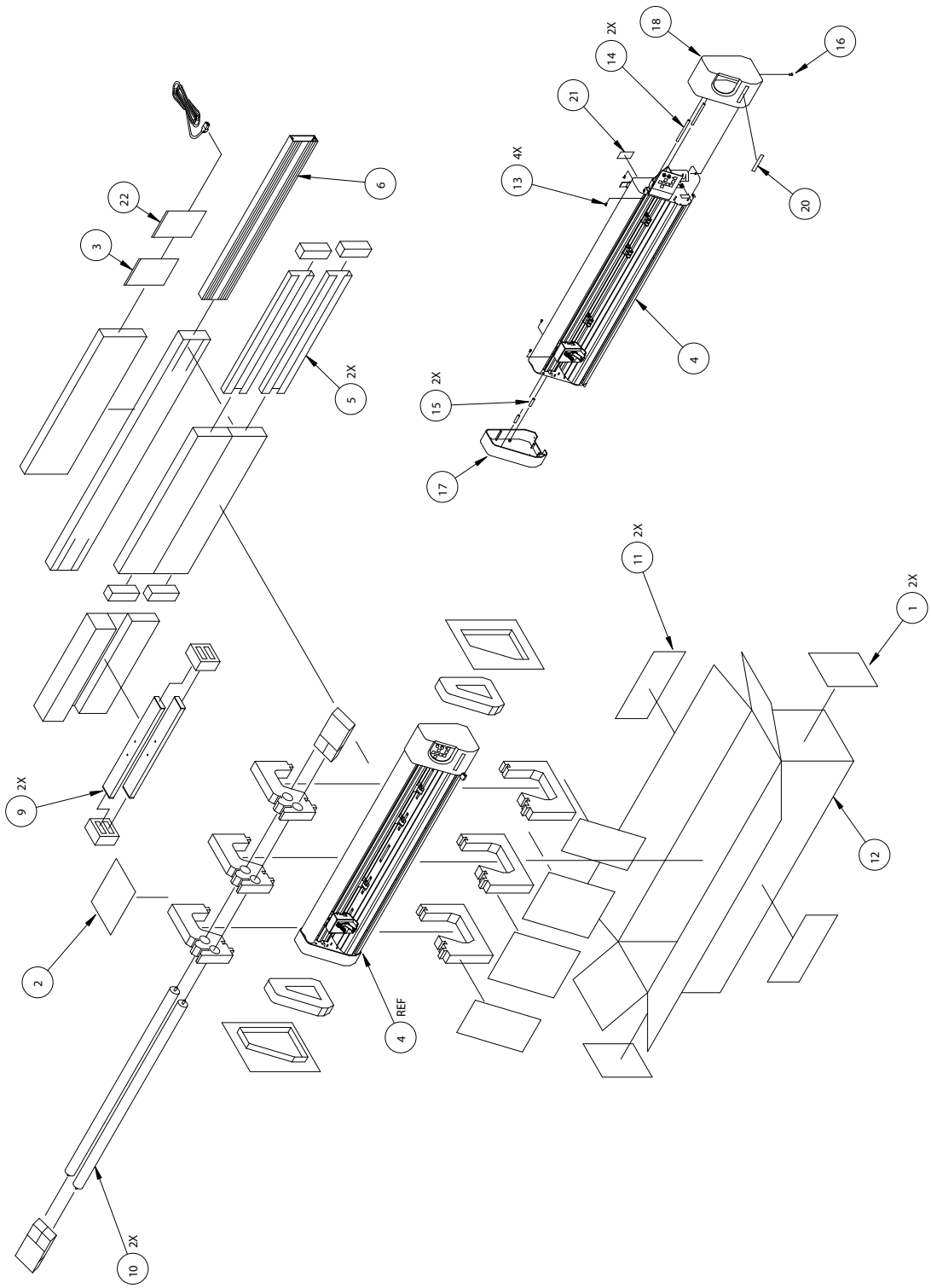

Figure 59. StudioJet Packing List.

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